

# South Carolina Drycleaning Restoration Trust Fund

Program Status Report  
December 15, 2004



South Carolina Department of Health  
and Environmental Control

Federal & Drycleaning Remediation Section  
Bureau of Land and Waste Management

The South Carolina Department of Health and Environmental Control has administered the Drycleaning Restoration Trust Fund for nine-years. This first status report from the program is divided into two parts. Part I provides background information on contamination problems common at drycleaning sites, innovative clean-up technologies, and monetary details on the Fund. Part II discusses each individual drycleaning site where Fund money has been used to date.

This report is intended to reach a wide variety of audiences, including the Drycleaning Community, the SC General Assembly and other elected officials, financial and real estate professionals, businesses, consultants, local governments and the general public.

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### **A Message From the Director**

The South Carolina General Assembly created the Drycleaning Restoration Trust Fund (DCRTF) in 1995 at the urging of the drycleaning industry. The fund was created to assist the small business owners of drycleaning plants who were increasingly facing financial pressure because of environmental problems dating back to years before environmental controls were required of the industry. The DCRTF was set up as a pool of money collected from the drycleaners that could only be used to deal with environmental contamination resulting from participating drycleaning plants.

It was known that contamination would likely be found at drycleaning plants when the DCRTF was created, although it is unlikely that anyone truly imagined the extent of the problem that would be discovered. Large contamination plumes have been found in groundwater at drycleaners across the State. Public and private water supply systems are threatened by some of the contamination. Small stretches of streams and other surface water bodies have shown measurable levels of drycleaning solvents. There are even concerns that drycleaning solvents could migrate into air in indoor residential living space air from subsurface contamination.

Unfortunately, the DCRTF has been under-funded since it's beginning. During the past legislative session, the General Assembly added a 1% sales tax on drycleaning to augment the revenues sources. While this is encouraging, it remains to be seen whether this extra tax will generate enough funds to effectively deal with the number of drycleaning sites in the state. But, even though under-funded, there are several positives for the environment as a result of passing the DCRTF legislation.

One obvious benefit comes because there are limited funds now available to deal with environmental problems arising from drycleaning plants. Before creation of the DCRTF, contamination was solely the responsibility of the owners and operators of the drycleaning

facility. Almost invariably, the responsible parties were unable to pay the costs of the site; therefore, there would be no abatement of the problem.

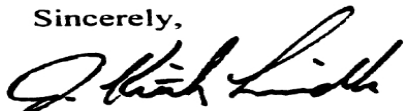
Another benefit is the ability to allow the Department to dedicate and direct resources toward drycleaning sites that are high priorities. Before the DCRTF was created, testing was usually done at drycleaning plants that were being sold (and, then only if a bank wanted assurances that it was not accepting contaminated property as collateral for its loan). Because the existing laws required that the contamination must be dealt with as soon as it was discovered, time and resources were devoted to sites that were changing hands because they were in thriving commercial areas. Oftentimes, these sites had only the slightest health impact, while sites that were likely to have significant health impacts went undiscovered because the drycleaning plants never changed ownership. Money in the DCRTF is collected from all participating drycleaners and can now be focused on sites that are likely to have the greatest health impact.

An extra bonus of the DCRTF comes about because the law creating the Fund requires drycleaning plants to make substantial improvement in their solvent-handling practices in order to actually benefit from the Fund. As a result, drycleaners participating in the Fund implemented containment measures that are more stringent than those required by other laws governing hazardous material management. While this will not remove the contamination that has already been released to the environment, these measures will greatly reduce the chance for further environmental problems from drycleaning plants operating today.

Out of necessity born by the funding limitations, the DCRTF program has developed as the Department's catalyst for innovative technologies that will eventually save money in assessing and remediating other contaminated sites. Already, the innovative assessment approach developed by the DCRTF staff has proven to be a cost-effective method that has been widely adopted elsewhere in the Department and among many private environmental consulting firms. In addition to being a direct proving ground for innovative technologies with drycleaning sites, the DCRTF has been a springboard for use of innovative technologies in other program areas within the Department. Innovative technologies originally targeted to the DCRTF have been implemented at Federal and State Superfund sites, Brownfield sites and Voluntary Cleanup sites.

I invite you to read this report on the South Carolina Drycleaning Restoration Trust Fund Program. We welcome your inquiries and participation for the successful implementation of this program.

Sincerely,



J. Keith Lindler, P.E., Director

Division of Site Assessment and Remediation  
Bureau of Land and Waste Management  
South Carolina Department of Health and Environmental Control

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Colonial Cleaners 97 Magnolia Avenue	Denmark 20
Anderson's Cleaners 197 Ireland Creek Road	Walterboro 22
Former Market Place Cleaners 11 Palmetto Bay Road	Hilton Head 23
Curry's Cleaners 1506 Highmarket Street	Georgetown 25
Former Thompson Cleaners 218 Bell Street	Bamberg 26
Prosperity Cleaners 126 Grace Street	Prosperity 27
Edwards Cleaners 208 Rosemary Street	Williston 28
One Hour Martinizing 409 Pearl Street	Darlington 29
Knightsville Cleaners 1580 Central Avenue	Summerville 31
Belvedere Cleaners 502 Clearwater Road	Belvedere 32
Color Craft Cleaners 9008 Marlboro Avenue	Barnwell 32
Joye One Hour Cleaners 1017 Godbold Avenue	Marion 33
Main Street Cleaners 208 North Main Street	Marion 35
Becknell Cleaners 201 North Congress Street	Winnsboro 36
Belton One Hour Cleaners 420 South Main Street	Belton 38
DeLuxe Cleaners 19 Mill Street	Williamston 39
Former Advance Cleaners 55 New Orleans Road	Hilton Head 40
Sixty Minute Cleaners 635 West Carolina Avenue	Hartsville 41
One Hour Cleanerizing 417 Georgia Avenue	North Augusta 42
Professional Cleaners 1131 West Greene Street	Cheraw 43
Dryclean USA #305 425 Johnnie Dodds Blvd.	Mount Pleasant 44
Kawasaki Cleaners 205 N Goose Creek Blvd.	Goose Creek 45
Superior Cleaners 2910 Abbeville Highway	Anderson 46
Hubbard's Cleaners 204 Graham Street	Florence 47
One Hour Martinizing No. 3 1700 Second Loop Road	Florence 48
Georgetown Cleaners 1230 Church Street	Georgetown 49
Dryclean USA - Pineland 302-B Pineland Mill	Hilton Head 49
Andrews Cleaners 2 East Main Street	Andrews 50
Dryclean USA-Pope Avenue 70 Pope Avenue	Hilton Head 51

**SC Drycleaning Restoration Trust Fund Sites**

**APPENDIX 1**



## **Part I: Why Drycleaners?**

The South Carolina Drycleaning Restoration Trust Fund (DCRTF) has been in existence since 1995 to deal with environmental contamination problems due to commercial drycleaning plants. Money for the Fund is collected from the drycleaning industry and is not augmented by any State revenues. The Fund may only be used to assess and remediate contamination from drycleaning plants that meet eligibility criteria set by the laws governing the Fund.

Almost every older drycleaning plant has contamination resulting from disposal practices that were common before the industry was regulated. A surprising number of newer plants also have measurable levels of contamination. The amount of contamination from many drycleaning plants is not necessarily in proportion to the size of the plant; large contamination plumes have been found at small drycleaning plants employing just a few workers. Altogether, it is estimated that at least 90% of the drycleaning plants in South Carolina have environmental contamination that will require assessment and remediation.

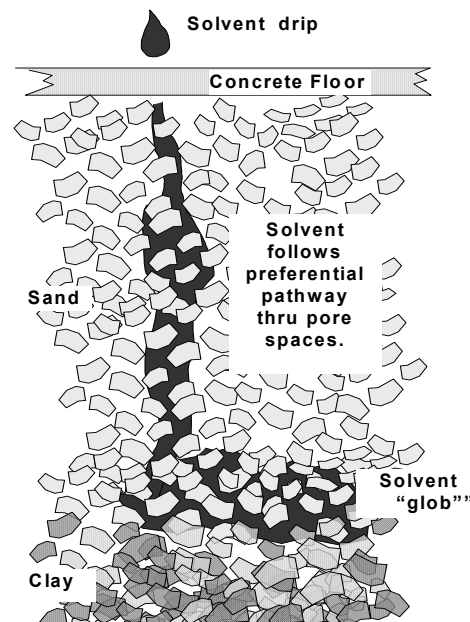
There are many reasons why drycleaning plants cause contamination; however, deliberate dumping of solvents usually is not a common cause for the environmental problems seen at drycleaning plants within South Carolina. As a general rule, drycleaners did not dispose of large quantities of solvent since it was usually recycled within the plant indefinitely. Instead, most of the contamination came from everyday drips and spills of solvents that occurred at even the best-run drycleaning plants.

The commonly used drycleaning solvents are either a man-made chemical known as Perchloroethylene (PCE) or various chemicals derived from Petroleum. Both solvent types are aggressive chemicals that easily penetrate many materials, including the concrete floors common at drycleaning plants. Regulations now require that the floors in drycleaning plants be sealed, but in the past, any solvent that dripped on the floor simply seeped through to the soil under the plant. Older plants especially had problems with solvents drips because the machines in use at the time required transferring solvent-laden clothes between a solvent machine and a dryer. Even with newer equipment, drips would occur over time as the solvents ate through rubber gaskets around the machine doors or the pipes carrying solvents would develop leaks at the plumbing connections.

Other releases came from waste byproducts created by the filtering and distillation processes necessary to re-use the solvent in the drycleaning plant. These wastes contain small amounts of solvent and are now collected by hazardous waste disposal companies. Before the disposal companies began operating in the late 1980's, the wastes were commonly discarded outside of the drycleaning plants. Even if the wastes were placed in trash dumpsters, the solvents still leaked into the ground through drain holes in the dumpsters. The distillation process also produces a water-solvent mixture that commonly went into sewer systems or was simply poured

out on the ground. Since the older drycleaning machines vented solvent vapors to the outside, solvents could collect in the soil around the drycleaning plants when the solvents condensed out of the vapor on cool mornings.

Since the solvents do not break down quickly, the small releases eventually accumulate into a significant source of contamination under the drycleaning plants. As discussed below, the small amounts of solvent trapped in the soil beneath the plants can be a continuing source of groundwater and surface contamination for years or decades to come. As a result, the drycleaning plants may be an on-going source of contamination long after they have stopped operating or have implemented measures to prevent further releases.

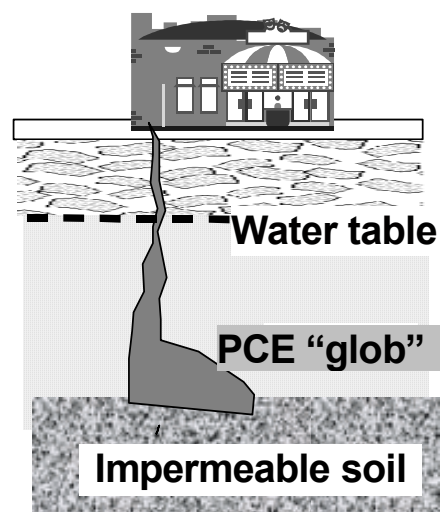


#### Groundwater Contamination

As the solvent accumulates in the soil outside the plant, it soaks into the open pore spaces between the soil particles and gradually moves deeper under the pull of gravity. A thin film of solvent remains behind on the soil particles. This film allows the next little bit of solvent filtering in from above to penetrate even deeper through the "solvent-wet" soil. A small leak over the same spot can be especially troubling: the constant drip creates tiny pathways that penetrate much deeper through the underlying soils than would occur if an equivalent amount of solvent was released at one time.

The solvent moving down through the soil often encounters less porous soils or rock formations that cause it to collect into a "glob". Fed by more solvent from above, the glob will begin to spread out along the top of the impermeable formation. In some geologic settings, the glob spreads out until it encounters cracks or channels that allow it to drain down further into the earth. In most regions of the state, the globs collect at depths that are beyond the feasible reach of excavation equipment.

Eventually, the solvent will reach the top of the water table (i.e., the depth where groundwater is normally found). Drycleaning solvents do not mix easily with water but instead separate out similar to oil and vinegar in a salad dressing. When the solvent encounters the water table, it behaves differently depending on whether it is a Petroleum-based solvent or PCE. Petroleum-based solvents are lighter than water and floats on water, whereas PCE is heavier than water and sinks to the bottom. If the solvent release is petroleum-based, the water table acts a barrier to prevent it from going deeper and a glob of nearly pure solvent will form floating on top of the water table. If the release is a PCE solvent, it continues trickling downward through the water table until it encounters an impermeable formation.



The PCE solvent then collects as a glob at the bottom of the water table. Regardless of which type of solvent is involved, the solvent globs do not usually move too far away from the spot where they first accumulate.

Although solvents do not readily mix with water, a small amount will eventually dissolve in the water and be carried away as a contamination plume by the groundwater. Even though just a small amount of solvent dissolves into the water, the resulting groundwater concentrations in the plume may be *thousands of times* higher than regulatory levels allow. The rate that the solvent dissolves into the water is so slow that it may take decades for the groundwater to completely dissolve all of the solvent from just a small release. In the meantime, the sub-surface glob continues to feed the contamination plume until it is completely dissolved.

As the groundwater slowly oozes through the source, the contamination plume spreads over a wider area over the ensuing years. As the contamination plume moves further away from the source area, the concentrations drop because of dilution with more groundwater and natural breakdown of the solvents (see section on Biodegradation.) Eventually, the plumes will reach a steady state condition where the amount of solvent dissolving into the groundwater is matched by the amount lost to dilution and Biodegradation. When this occurs, the contamination plumes no longer spread any further from the source but may persist for decades if not remediated.

#### Surface Water Contamination

Investigations by the DCRTF have found drycleaning solvents in smaller surface water bodies such as ditches, canals, and creeks. In most instances, the solvent has been carried to the surface water by a groundwater contamination plume that discharges to the surface water. Surface water contamination can also occur from stormwater run-off carrying solvent-soaked soil from around the drycleaning plant.

The solvents usually do not last very long or move very far in surface water. Most often, they simply evaporate from the water into the air. Occasionally, solvents last longer in slow moving streams or ponds. Solvents may be found in fish that grow in solvent-contaminated waters; however the substances do not increase in concentrations in fish tissue (i.e., bioaccumulate). The concentrations in surface water usually are not at significant levels in terms of a consumption risk.

#### **Interested in Drycleaning Groundwater Contamination?**

For additional information on the various types of technologies the DCRTF uses to assesses groundwater and a general understanding of groundwater in the state, see the report:

*Drycleaning Sites and Groundwater Contamination: A Primer*

Available from our website at

<http://www.scdhec.gov/lwm/html/dryclean.html>

PRINT COPIES are available from the Toll-Free DCRTF Hotline:

1-866-DHECDRY

(1-866-343-2379)



## **Clean-up Standards**

South Carolina sets stringent standards to protect human health and the environment. The standards are protective of the health of the public that could come in contact with the solvents via various exposure mechanisms. The DCRTF considers potential exposures via three main routes: groundwater, surface water, and direct contact (soil exposure).

Perchloroethylene (PCE) and its breakdown components may cause cancers in laboratory animals exposed to high concentrations over long periods of time. Some components of Petroleum-based solvents have also been shown to cause cancers in laboratory animals; however, many of the petroleum breakdown compounds have not been tested or have been inconclusive with animal testing. It is not known whether either of these solvents can actually cause cancers in humans; however, South Carolina's standards are designed to be protective in the event that these compounds are ever determined to be human cancer-causing agents. Both solvents also have non-cancer health effects with much higher concentrations (usually in industrial exposures); however, these types of concentrations are not encountered in environmental exposures.

### Groundwater Standards

By law, all groundwater in the state is classified as drinkable and must be protected to the State Drinking Water Standard. By default, the State Drinking Water Standard is set at levels defined by the Federal Environmental Protection Agency as the Maximum Contaminant Level (MCL). These levels are set to be safe for a person consuming the water everyday as their only source of water over a thirty-year period. The standard assumes the person is drinking two quarts of the water per day.

The Drinking Water Standards that are enforced for PCE and its breakdown compounds are:

Perchloroethylene	(PCE)	5 ppb
Trichloroethylene	(TCE)	5 ppb
Dichloroethylene	(DCE)	70 ppb
Vinyl Chloride	(VC)	2 ppb

Petroleum-based solvents are actually a mixture of many chemicals with different MCLs ranging from 5 ppb to more than 100,000 ppb. Therefore, the applicable standards depend on which chemical is actually found in the groundwater.

### Surface Water Standards

Surface water must meet standards that are consistent with its use. Surface water collected for drinking water must meet the same MCL standards as above for all water delivered to the consumer. Additional standards may apply depending on whether the surface water supports a fishery. Stricter standards apply if the water is used for both drinking water supplies and fisheries. The levels are set to be safe for a person consuming fish from the contaminated water every week over a thirty-year period. Different standards are also required depending on whether the water is freshwater, brackish or saltwater.

### Direct Contact (Soil Exposure) Standards

Soil Exposure assumes a person will take in small amounts of the contaminated soil on a daily basis in one of two ways. The first method assumes that the person will accidentally ingest small amounts of dirt transferred off the hands or objects that have been in contact with the contamination. The second method assumes that the person continually swallows a small amount from breathing in contaminated dust. Both of the methods assume the person is in close contact with the contaminated soil area on a routine basis.

Different soil exposure standards are set depending on whether the soil is found on industrial or residential properties. The residential standards are much lower because of the assumption that that a person is exposed more frequently and for long duration in their gardening activities than would occur in an industrial setting.

#### **What is a “Part per Billion” (ppb)**

Most of the regulatory and analytical levels used by the DCRTF are referenced as “part per billion (ppb)” concentrations. Part per billion is a convenient way to refer to measurements that are technically made as a microgram per liter (abbreviated as *ug/l*) if measured in water, or microgram per kilogram (abbreviated as *ug/kg*) if measured in soils.

Part per billion concentrations are extremely tiny concentrations. As an indication of how small the concentrations are, one part per billion equals:

One inch in 16,000 miles.

1½ inches in the total length of the Earth around the Equator.

One second in 32 years.

One penny in \$10 million.

For another perspective, one ounce of Perchloroethylene (PCE) drycleaning solvent will make a 1 ppb concentration in thirteen million gallons of water, which is enough water to fill fifteen Olympic size swimming pools. The same one ounce of solvent is enough to contaminate water in three of those swimming pools above the regulatory standard of 5 ppb.

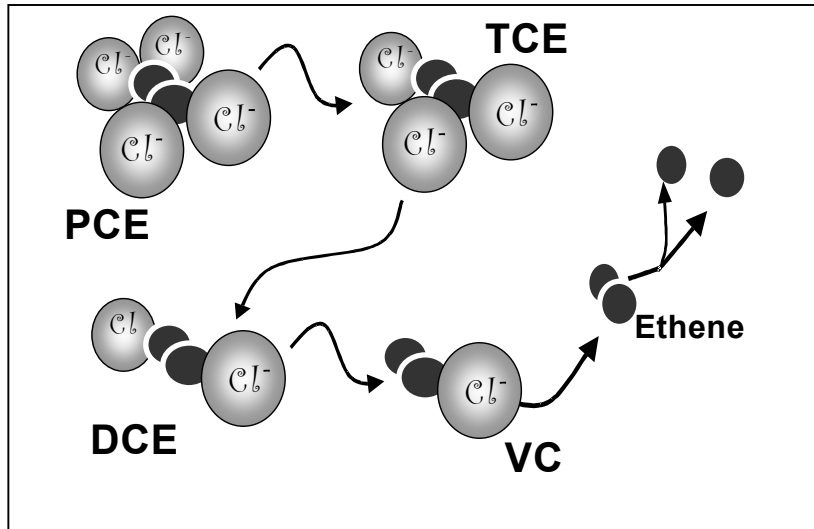
**Note:** Analytical laboratories measurements are sometimes reported as milligrams per liter (written as *mg/l*) or milligrams per kilogram (*mg/kg*). These are *part per million (ppm)* concentrations. For purposes of this report, all ppm concentrations have been converted to ppb levels. 1000 ppb = 1 ppm.

## Biodegradation of Drycleaning Solvents

Drycleaning solvents are classified as ***persistent compounds*** because they do not easily break down in the environment. Eventually, they do break down in a natural process known as biodegradation, which requires specific strains of bacteria that have adapted to using the solvent as a food source. Biodegradation is very unpredictable because the right bacteria must be present and there must be exactly the right conditions for the bacteria to act. In some geologic conditions, more than three hundred years may be required to degrade Perchloroethylene (PCE).

The bacteria occur naturally in soil but vary in their distribution and effectiveness. Large numbers are found in some soils, while they may be totally absent elsewhere. Even if they are present, the bacteria do not always adapt to the solvents that have been released on a site. Frequently, the bacteria do not completely consume the solvent but instead convert it to various breakdown compounds. Other bacteria may attack the breakdown compounds, but occasionally the breakdown compounds will accumulate causing additional environmental problems.

The PCE molecule is composed of four chlorine atoms bound with two carbon atoms. As the bacteria degrade the PCE molecule, they break off a chlorine atom to form Trichloroethylene (TCE), which is a common industrial degreasing agent. Further bacterial attacks knock off a second chlorine atom, forming Dichloroethylene (DCE). DCE commonly accumulates in the environment because different bacteria are needed to degrade the molecule even further. If there are bacteria that succeed in knocking off another chlorine atom, the remaining compound is Vinyl Chloride (VC). Bacteria easily consume VC, so it usually does not stick around long but instead is converted to "Ethene", which dissipates quickly. Regulatory levels have been set for all of the chlorine-containing breakdown compounds.



The Petroleum-based solvents do not have a clear-cut breakdown sequence because the solvents are actually mixtures of many petroleum derivatives with many other synthetic industrial compounds added to stabilize the mixtures and reduce flammability. The various compounds degrade at different rates and produce a wide range of intermediate breakdown components. Generally, bacteria in the soil adapt easily to consume the petroleum derivatives, but may not affect the other compounds. Regulatory levels have not been set for most of the compounds that are formed from degradation of Petroleum-based solvents because they are so uncommon.

## Innovative Technologies

Because traditional remediation methods are costly and drawn-out, the South Carolina Drycleaning Restoration Trust Fund Act encourages DHEC to “use the most cost-effective alternative that is reliable and feasible technologically”. To meet this goal, the Department continues to seek out innovative technologies that may be of use at drycleaning sites. There is no cheap “magic bullet” for remediation, but innovative technologies in South Carolina have cut the projected costs and time of remediation by 50-85% over the traditional methods.

In years past, the standard clean-up method for groundwater contamination was “Pump and Treat”. Pump and Treat consists of placing recovery wells downgradient of a site to collect groundwater. The contaminated groundwater is pumped from the wells to aboveground treatment systems. The treated water is then pumped to the local sewer system (with permits), discharged directly to surface water (with applicable permits) or re-injected into the groundwater aquifer. Pump and Treat systems rarely attack the source of the contamination and are costly to operate for the length of time required at drycleaning sites.

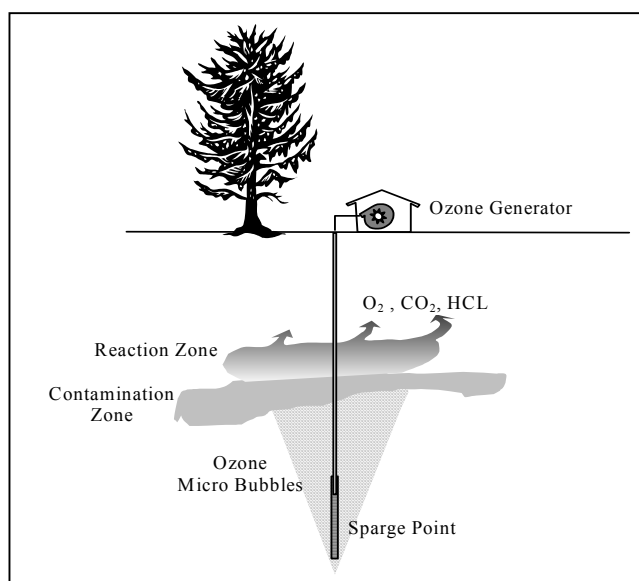
Through its involvement with the State Coalition for the Remediation of Drycleaners and the Interstate Technology and Regulatory Council, the Department is continuing to evaluate innovative methods of cleaning up these sites. Many promising technologies are on the horizon and several have tentatively been slated for potential use at drycleaning sites in South Carolina as funds become available to implement them.

The following innovative technologies have been used by the DCRTF:

### Ozone Injection

Ozone is an unstable ( $O_3$ ) form of oxygen that is produced by electrical sparking. Because it is so chemically reactive, ozone cannot be stored or transported. It must be generated on-site using specialized electrical equipment. When injected into the contamination, it quickly reacts with drycleaning compounds to chemically convert them to harmless by-products. Ozone causes Perchloroethylene to degrade rapidly and destroys any breakdown components of Perchloroethylene that may accumulate on a site.

The main obstacle with using ozone comes in getting the ozone gas into contact with the contamination. Special injection points, known as sparge wells, are required to break the ozone into micro-bubbles that are pumped below the contamination zone. The micro-bubbles rise through the subsurface soils and encounter the contamination. The ozone quickly transforms the drycleaning solvents to oxygen, carbon dioxide and a weak hydrochloric acid. The oxygen and carbon dioxide rise through the soil

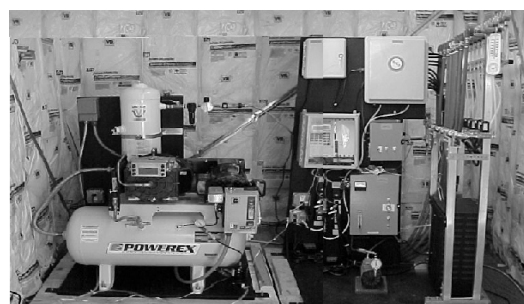


to the surface. The hydrochloric acid is diluted out by groundwater.

Ozone will react on contact with any organic matter. This can be a problem with soils that are high in organic content, because the ozone is consumed by peat, humus, and other natural organics before it can attack the drycleaning solvents. Given enough time and an abundance of ozone, the natural organics will eventually be “burned out” and the ozone can then begin to destroy the contamination.

The ozone generators and the various air pumps required for the system are housed in small equipment buildings constructed on the site. The sparge points are connected to the generator by pipes that are usually placed underground. One ozone generator can supply 6 to 10 sparge points, but there is a limit on how far apart the points can be because the ozone self-destructs in the pipes. As a result, ozone injection is usually feasible only for sites with high concentrations of contaminants within a relatively small area.

After the system is installed, there is usually no indication to the casual observer that a remediation system is operating at the site other than the equipment building. Periodic monitoring is done until the contamination is reduced to acceptable concentrations, at which time the ozone generator is turned off. Once the system is off, the sparge points are left in place and can be re-connected to an ozone generator in the event that the contaminant levels should rebound.



**Ozone Generator at the Former  
Marketplace Site, Hilton Head.**

Ozone injection has been used successfully to achieve cleanup goals at one drycleaning site in South Carolina (Former Marketplace –Hilton Head). It is being implemented at two other drycleaning sites (Colonial Cleaners –Denmark, Joye Cleaners –Marion). Based on the success at the drycleaning sites, it has also recently been selected to replace an ineffective remediation system underway at a Federal Superfund site in the state.

#### Potassium Permanganate

Potassium permanganate is a chemical bleach that is diluted with water and injected into the contaminated zones. The potassium permanganate causes drycleaning solvents to chemically degrade without forming harmful byproducts.

Potassium permanganate is used up in the chemical reaction with drycleaning solvents. Other organic substances and naturally occurring minerals in the soil also chemically consume it. As a result, potassium permanganate cannot be used in all soil types. Special testing, known as Potassium Permanganate Soil Demand, must be done to determine the amount of potassium permanganate that is necessary to overcome the natural soil's chemistry and still provide an excess to react with the drycleaning solvent contamination. Oftentimes, a larger quantity of potassium permanganate is required to overcome the natural soil potassium permanganate demand than the drycleaning solvent itself requires.

The major problem with potassium permanganate comes in getting enough of it into contact with the contamination. In many cases, it is physically difficult to inject the large quantity of potassium permanganate needed into the groundwater and have it spread out through the contamination

zone. It is usually necessary to inject small amounts at many points spread out over the site. Because the most effective method requires lots of injection points, permanganate is usually injected with direct-push apparatus. Special injector points are hydraulically driven into the ground, the permanganate injected, and the injector point then withdrawn and moved to the next injection location.

The injections may be repeated at intervals over several months to allow groundwater flow to carry the permanganate throughout the contaminated area. Usually the repeat injections are also done with direct-push apparatus; however, semi-permanent injection wells can be installed if multiple injections are planned for a site. Semi-permanent injection wells can also be installed if the direct-push apparatus cannot be used because of difficult geology or the contamination is too deep. However, semi-permanent injection points can make this too costly for many sites.

A few minor problems can occur with permanganate injection. In some geologic conditions, manganese dioxide accumulates in the groundwater as the permanganate reacts. Manganese dioxide is a naturally occurring compound, but it can clog the groundwater aquifer in high concentrations. If this occurs, the contamination cannot be removed from the groundwater because the permanganate can no longer come into contact with it. Permanganate also causes fish kills if it migrates through the groundwater into surface water. Permanganate use must be carefully monitored if there is any chance the groundwater will carry it to a nearby surface water body.

Because it is such a strong bleach, permanganate requires special handling and protective clothing for the workers injecting the chemical. Once injected, there is usually no evidence of its use other than the sealed holes at the surface where the direct-push equipment was used.

Potassium permanganate has been injected into groundwater at one drycleaning site (One Hour Martinizing –Darlington). Post-injection samples have shown some reduction in the contaminant levels on the site; however, there has not yet been enough time for the permanganate to react.

#### Air Sparging With Soil Vapor Extraction

Air Sparging With Soil Vapor Extraction (AS-SVE) is a physical removal method that is effective against the globs of un-dissolved solvent that may collect beneath a drycleaning plant. Unlike the previous innovative technologies, AS-SVE does not destroy the sub-surface contamination, but instead moves it to the surface where it is usually collected for off-site disposal. While it can be used to treat dissolved groundwater plumes, AS-SVE is usually only cost-effective and practical when there is a large quantity of un-dissolved solvent under a site.

AS-SVE has two basic components. Specially designed Air Sparging well points are used to blow air below the area where the un-dissolved solvent has collected. The large volume of air moving up through the solvent causes it to evaporate and move upward in the air bubbles toward the surface. Strong vacuum pumps connected to wells installed above the contaminant pool collect the solvent-vapor mixture. The vapor mixture is usually routed through an activated charcoal or some other system that separates out the solvent for off-site disposal as a hazardous waste. Occasionally, SVE systems may be permitted to discharge the vapor directly to the atmosphere if the amounts of solvent are low.

AS-SVE is most effective in light soils (sands, loams, etc.) and areas with drier climates or deep groundwater. In heavy soils, the blowing air tends to create micro-channels through the sub-soil that often miss evaporating all of the solvent from the sub-soil. In wetter climates and areas where the groundwater is near the surface, the vacuum wells pull a lot of water along with the vapor. Because the solvent cannot easily be separated from the water, it must be treated similar to the water collected in a Pump and Treat system.

A major disadvantage of AS-SVE is that both the air pressure pumps and the vacuum pumps have to move large volumes of air. As a result, they can be quite noisy. Recent advancements in sound-deadening technology have proven useful, although the equipment cannot easily be located close to houses or other areas where the noise may be a problem.

AS-SVE has been proposed for temporary use at one drycleaning site (Becknell Cleaners – Winnsboro) to reduce the bulk of the un-dissolved pool of PCE underlying the site. The final remedy will use Permanganate to remove the remaining PCE and address the dissolved plume.

#### Monitored Natural Attenuation

Monitored Natural Attenuation (or “MNA”) is not exactly an innovative technology, but instead offers a different approach for dealing with low levels of groundwater contamination. Typically, the contaminant concentrations in a groundwater plume get progressively lower moving away from the source. While the concentrations may be above the allowable standards, it may not always be economically or technologically feasible to remediate the contamination in the fringes of the plume.

MNA is used when the groundwater concentrations in the fringes do not pose an immediate health threat *and* an active remedy is being implemented on the source areas of the plume. Once the contamination source is removed, natural processes can be allowed time to attack the low concentrations in the plume fringes. MNA meets a rigorous monitoring standard to ensure that the concentrations in the plume fringes will be resolved by natural processes. The DCRTF always develops a contingency plan to implement an active remedy in the fringe areas if the concentrations do not begin to decline on their own as the source area is remediated.

#### **The State Coalition For the Remediation of Drycleaners (SCRD)**

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of thirteen states with established drycleaner remediation programs. The Coalition's primary objectives are to provide a forum for the exchange of information and the discussion of implementation issues related to established state drycleaner programs; share information and lessons learned with states without drycleaner-specific programs; and encourage the use of innovative technologies in drycleaner remediation. The principle focus of the Coalition is to promote the most efficient use of limited remediation funds through use of innovative technologies and approaches.

The South Carolina DCRTF has been a member of SCRCD since its inception. Staff members have co-authored papers, chaired committees and presented at national meetings with the Coalition on uses of innovative technologies and assessment techniques.

For further information on SCRCD, please visit the Coalition's web site at :  
***<http://www.drycleancoalition.org>***

## **Public Participation in the Drycleaning Program**

Once enough analytical information has been collected on a drycleaning site, the DCRTF assigns a contractor to review the various technologies that may be effective for cleaning it up. A Feasibility Study from the contractor provides an in-depth evaluation of the site characteristics and information on the remedies that can be used. Some remedies are eliminated early in the process as impractical for the site. The others are developed further with detailed information on implementation strategies, cost estimates, and conceptual lay-outs. While the Feasibility Study will usually point to one or two remedies as clear-cut choices, the DCRTF seeks public input before finalizing selection of a remedy.

The DCRTF involves the public in the remedy selection process for several reasons. This allows an opportunity to address any concerns that the public may have about the site. In many cases, a few minor changes in the remediation equipment will satisfy any detractor. Also, people living near the site may be aware of conditions that could affect the effectiveness of the remediation. On several occasions, local residents have shared important information during public meetings that aid the DCRTF's understanding of the site.

In order to encourage public participation, the DCRTF conducts the public meeting near the drycleaning site. A Department spokesperson presents an overview of the site conditions and explains the potential remedies that have been considered in detail. At the conclusion of the presentation, an open forum is allowed for public comment and a question-and answer session. A court reporter compiles an official transcript of the meeting to ensure that all comments are accurately recorded. People are also encouraged to call the DCRTF's toll-free telephone number if questions occur to them after the meeting.

A thirty-day public comment period starts at the conclusion of the meeting. All written comments submitted to the Department and all comments recorded during the public meeting are considered prior to finalizing the remedy selection. The final remedy is documented in a Record of Decision signed by the Deputy Commissioner of Environmental Quality Control. The Record of Decision includes a response to each comment, which are also provided to the person who made the comment.

The DCRTF uses a variety of methods to get the message out to the public about the public meeting and the comment period. A legal notice is inserted in the local newspaper serving the town where the drycleaning plant is located. Since many of the smaller town newspapers do not have daily editions, a legal notice is also run in the Sunday edition of the major regional newspaper in general circulation in the town. While the DCRTF does not usually do a press release about the meeting, local newspapers and television stations have frequently featured stories prompted by the legal notice.

The DCRTF also sends a letter about the meeting to people living near the site. Since these names and addresses are obtained from a national computer database, the recipients are asked to share the information with their neighbors since the message may not get to everyone. These letters include information on the site and a summary of the various remediation methods that



were considered. Similar letters and information are also mailed to the local government officials and elected members of the S.C. General Assembly representing that area.

As part of the effort to involve the public in the site decisions, an official document repository is established in the community. Usually, the local public library serves as the repository so that people may review the documents. The repository includes copies of the analytical data, feasibility studies, meeting transcripts, the Record of Decision, and any other documents that the remedy selection may have been based on. Since the amount of documentation may be overwhelming for some public libraries, electronic copies of the documents have been provided to some locations. A complete copy of the repository is also available for public review during normal business hours at the SCDHEC Bureau of Land and Waste Management office, 8911 Farrow Road, Columbia, SC.

The following public meetings have been conducted by the DCRTF prior to selecting a remedy for the site:

Curry's Cleaners, Georgetown High School Auditorium, Georgetown.  
Former Market Place Cleaners, Palmetto Electric Cooperative Auditorium, Hilton Head.  
One Hour Martinizing, Darlington Judicial Center Courtroom, Darlington.  
Color-Craft Cleaners, Barnwell County Courthouse, Barnwell.  
Colonial Cleaners, Dane Theater, Denmark.  
Joye Cleaners, Marion Opera House, Marion.  
Deluxe Cleaners, Williamston Town Hall, Williamston  
Mainstreet Cleaners, Marion Opera House, Marion.  
Becknell's Cleaners, Winnsboro Fire Station, Winnsboro

In addition to involving the public in the remedy selection process, the DCRTF has notified the public about on-going drycleaning investigations at these sites because large groundwater contamination plumes have spread under many properties and there was the potential for heightened public interest:

Dryclean USA, Mount Pleasant.  
Edwards Cleaners, Williston.  
60 Minute Cleaners, Hartsville

These notifications were done through a combination of press releases to local media outlets and letters direct-mailed to houses in the affected areas. The residents have been asked to contact the DCRTF toll-free telephone number if they had a well in the area. By involving the public on these sites, additional sampling points were identified that allowed the DCRTF to fore-go installing some monitoring wells because private wells could be used instead. A public meeting was also held at the Williston Town Hall to inform the public about the extent of the groundwater contamination from the Edwards Cleaners site even though a remedy has not yet been selected for the site.

## Funding

The South Carolina Drycleaning Restoration Trust Fund was created by a legislative act in 1995. The SCDHEC is responsible for administering the Fund, while the SC Department of Revenue (DOR) is responsible for drycleaner registration and collection of money into the Fund.

Revenue for the Fund has historically been derived from two sources: The registered facilities pay yearly fees into the Fund based on their number of employees; and a surcharge is assessed on every gallon of drycleaning solvent purchased for use in the state. Surcharges are not collected from drycleaners that registered with DOR as opting out of the Fund (allowed only for drycleaners that used petroleum-based solvents at the start-up of the Fund in 1995).

As the result of declining revenues to the Fund as discussed below, a legislative change enacted in May 2004 added a 1% sales tax on drycleaning as a third source of revenue. The 1% sales tax is only charged to drycleaners participating in the Fund. Imposition of the 1% sales tax began on July 1, 2004 (i.e., FY 04-05).

DOR began collecting money for the Fund in October 1995 (i.e. Fiscal Year 95-96). Annual revenues peaked in FY96-97 at just over one million dollars (\$1,005,000) and have declined every year since. Only \$613,000 was collected in FY02-03, before rebounding slightly in FY03-04 to \$655,000. Yearly income over the past three years may have somewhat stabilized at a yearly average of approximately \$640,000.

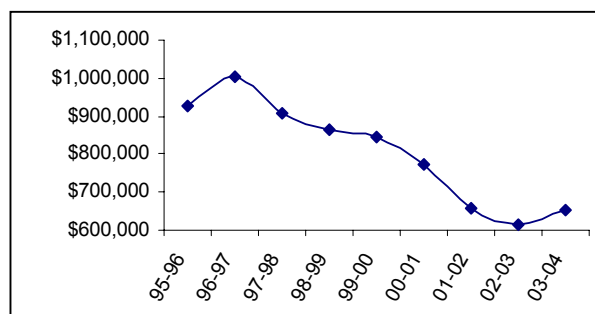


Figure 1: Yearly Income to Fund by Fiscal Year

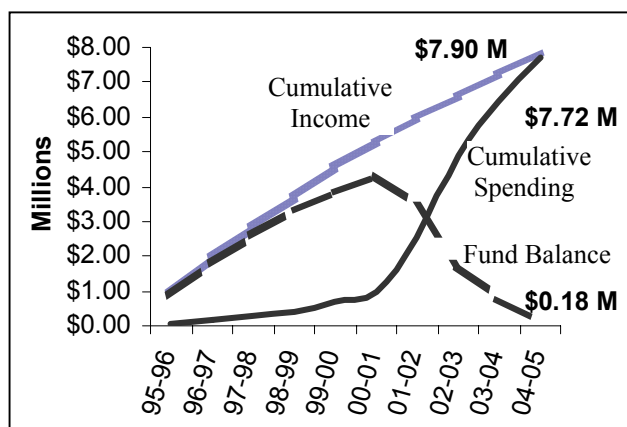


Figure 2: Fund Income to date, Spending and Balance by Fiscal Year

For the first three years, the only expenses to the Fund were minor amounts necessary to pay salaries and Departmental expenses while regulations and procedures were developed. Expenses increased slightly over the next two years as a limited amount of fieldwork was conducted to obtain information necessary to prioritize the large number of sites that had applied to become eligible for the Fund. In FY01-02 and FY02-03, expenses mounted in earnest as assessment activities began on several sites and remediation systems were implemented. By early FY03-04, the Fund balance had

dropped so low that work had to be suspended on most sites. Since some sites have remediation systems in place, there are on-going budget obligations for operation and maintenance beyond the current Fiscal Year.

### Funding needs

DOR has registered 292 operating drycleaning plants into the Fund since 1995. Because of the May 2004 legislation change, additional drycleaning plants have until July 1, 2005 to register. Each registered plant could potentially end up drawing money from the Fund. In addition, there are 74 drycleaning plants that stopped operating before 1995 and one site operated by a solvent supplier that are currently eligible for the Fund. Altogether, there are 379 known drycleaning sites that may use Fund monies plus an unknown number of sites that can still register and become eligible for assessment and remediation funding.

It is estimated that \$147 million will be required over the lifetime of the Fund for just the known sites. This amount may be considerably under-estimated because it is based on assumptions that future sites will not require the level of funding expended thus far and has not been adjusted for inflation. The actual amount may be considerably higher by the time all drycleaning sites are cleaned up to the levels required by state law. This figure includes estimates of \$59 million for assessment costs, \$88 million for remediation costs including the money needed for long-term Operations and Maintenance of remedies installed at drycleaning plants. The underlying assumptions for each of these estimates are detailed below:

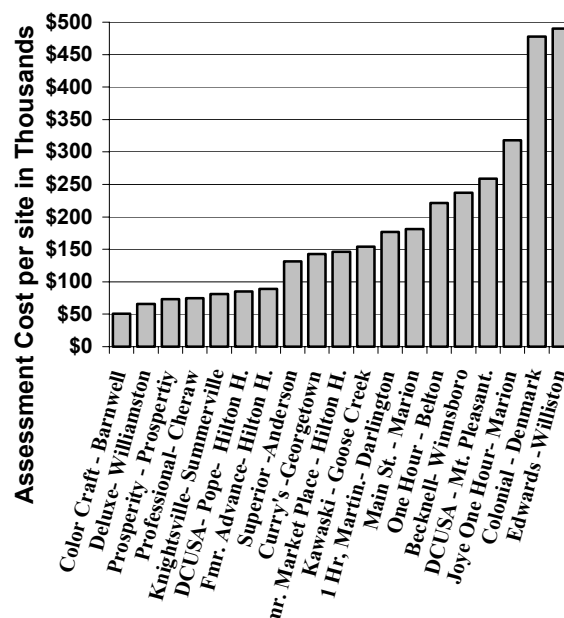
### Assessment Costs

Assessment costs are incurred during activities to delineate the extent of the contamination. A large portion of the assessment costs at drycleaning plants comes about because of the expense of investigating groundwater contamination.

The DCRTF has completed assessment at eighteen drycleaning sites with per-site costs ranging between \$51,000 and \$477,000. Since these sites have been in the different geologic regions across the state, the average cost of assessing each site (\$182,000) may reasonably be expected at each of the remaining sites.

For cost estimating purposes, it is assumed that the average costs will drop at least 10% due to increased efficiencies of the program as experience is gained with more sites. It is also assumed that some lower priority sites will be less expensive to evaluate because it is probable that the contamination will be less extensive than has been found at the higher priority sites.

Because there are few constraints to becoming eligible for the Fund, it is assumed that 95% of the 379 known drycleaning sites will meet all requirements (i.e. 360 will be Fund eligible).

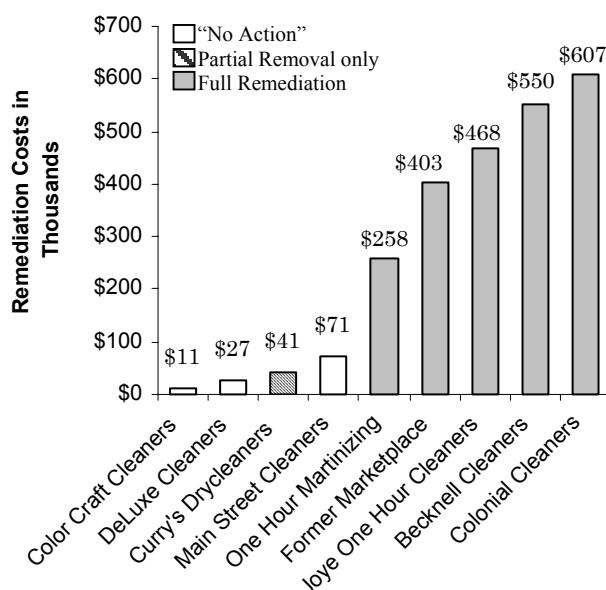


Assuming the average assessment cost can be decreased to \$161,000, it will require at least \$59 million for assessment costs to investigate the sites.

### Remediation Costs

Once the sites are investigated, they usually require some type of remedy in order to meet the applicable standards. Of the sites investigated to date, 23 out of 26 will require a full remediation system funded by the DCRTF. Even if a full remedial system is not needed because the levels of contamination are low, sites will usually require a few years of monitoring to verify that the contamination does not worsen. It is likely that less than 5% of all sites investigated will not need any follow-up expenditure for either remediation or long-term monitoring.

The DCRTF has installed remedial systems at four sites and has plans for another when money becomes available. These systems have averaged \$457,000 per site, including all costs of installation and the projected costs of operation and maintenance (O&M) for the number of years that will be required until the clean-up goals are met. It has been determined that three sites do not need a remedial action other than long-term monitoring. The average cost of this monitoring has been \$36,000 per site. Remedial expenses have been incurred at one other site for a partial remedy. The costs of this action have not been included in these estimates since the site will eventually require a full remediation.



Current trends suggest that 90% of all drycleaning sites may have levels of drycleaning contamination that will require corrective action. However, for cost estimating purposes it is assumed that only 75% of the sites will need a full remedy, as it is likely that lower priority sites will be less contaminated than has been found with the sites investigated thus far. It is also assumed that the average cost of remediation can be reduced 30% (to \$320,000) because lower priority sites should not have the same extent of contamination. Most of the remaining sites will require monitoring for 2-3 years to ensure the contamination is adequately accounted for. Based on these assumptions, \$86 million will be needed for full remediation systems at 270 sites (75% of 360) and additional \$2 million for "No Action" monitoring at approximately 72 sites.

### Five Year Funding Projection

Under the provisions of the SC Drycleaning Restoration Trust Fund Act, the Department may fund up to four positions for administration and implementation of the Fund. The Department's DCRTF staff consists of a mixture of engineers, environmental scientists, and hydro-geologists with nationally recognized expertise in assessment and remediation of drycleaning contamination problems. Given an adequate source of funding, this staff has the capacity to implement fifteen drycleaning site assessments and twelve remedial designs/installations per year, in addition to overseeing O&M and long-term monitoring at sites already underway. To maintain this level of

effort, the Fund would have to generate at least \$6 million per year based on the cost figures estimated above. Even at this ambitious pace, the Fund would require nearly twenty-five years to evaluate all of the known drycleaning sites, plus an additional five to ten years to complete remediation.

The recently imposed 1% sales tax generated approximately \$115,000 during the first quarter of FY 04-05. Drycleaning earnings fluctuate with the seasons; earnings generally peak during late winter through early spring and trail off during the warmer months. Because the 1% sales tax has only been collected during the warmest three-month period of the year, it is uncertain whether the \$115,000 actually represents one-quarter of the annual revenue the tax will generate. Based on conversations with drycleaners in the state, less than 20% (i.e., one-fifth) of their yearly business is done in the three-month period. If so, then the 1% sales tax should generate at least \$570,000 annually (i.e., 5 X \$115,000). If the income from the solvent fees and annual fees have stabilized at \$640,000 as assumed above, then the Fund is expected to generate approximately \$1.2 million annually.

Because of funding shortfalls, the Department stopped work on most drycleaning sites in FY03-04. On many sites, the investigations were taken to a natural stopping point, while seven were suspended without determining the full extent of the contamination. It is estimated that another \$800,000 will be required to complete these investigations and at least six of them will require full remediation systems. There is also a backlog of ten sites that have been assessed but are waiting on funds before remediation systems can be installed. Assuming the average costs of remediation as above, it will require at least \$5.4 million just in new remediation costs for the sites on which the Department has already begun work. In addition, there are current budget obligations of \$530,000 for remedial systems already in place and ongoing Department operating expenses averaging \$240,000 per year.

Current income projections show the Fund will generate no more than \$6.8 million over the next five years (including the current balance), while nearly \$8 million will be needed simply to finish the ongoing work. Because the Fund may not operate at a deficit, it is projected that some of the current sites will have to be delayed even further beyond this time frame. This delay will cause extra costs, as it will be necessary to recollect data on some of the sites; however, this has not been factored into these cost estimates.

In all probability, it will be at least six years before the Fund recovers sufficiently to allow investigation or remediation of any of the other sites on the priority list. With only \$1.2 million coming into the Fund annually, it will take more than 150 years to complete assessment of the known drycleaning sites.

## Prioritization

Registered Drycleaning Plants are not eligible for the Fund until an eligibility application is filed with the Department. The eligibility application includes documentation that the drycleaning plant meets all of the criteria specified by the law. The Department assigns a priority ranking to the site using information provided by the drycleaner in the eligibility application.

The Appendix is a listing of all sites that are potentially eligible for the Fund along with their priority ranking. The lower numbers (i.e., 1, 2, 3, etc.) are assigned to the sites that are most likely to have the greatest health effect, thus site #1 is the **highest priority** site in the state and is thought to be the site most likely to affect the largest number of people.

The priority is determined by a complex scoring system that emphasizes the potential threats to human health that can occur from drycleaning solvent contamination. The scoring system makes assumptions, which err on the side of caution, about the potential human exposures to contamination from a site. Unless a particular exposure pathway from the site is known to be nonexistent, it is assumed that a potential threat is present via that mechanism. While this approach frequently overestimates the health threat of a site, it is designed so that a potential threat does not get overlooked.

Every drycleaning plant is also assumed to have environmental problems even if the limited testing conducted during the eligibility application process did not detect any contamination. This assumption has consistently been proven true in the additional testing at the drycleaning plants (either by the DCRTF or by private parties conducting pre-buy assessments). In most cases, it is simply a matter of sampling from a different spot or depth than was done originally. Another common assumption used in scoring the sites assumes that nearby people use private wells as their source of drinking water if public water lines do not serve the area. Other assumptions used in assigning the priorities are based on site-specific information of the age of the plant, the types of solvents used, regional geology, and surrounding land-uses.

The Appendix lists all sites that are potentially eligible for the Fund along with their priority ranking. Priorities have not been assigned to all of the sites for one of two reasons. First, some information used in assigning the scores comes from the application information submitted by the drycleaner. If an eligibility application has not been submitted, then the information is not available and the site cannot be scored. The second reason stems from when the application was submitted to the Department. The bulk of the registered drycleaning sites applied to be Fund Eligible in September 1997 (before the out-of-pocket deductibles increased the first-time). Over the next year and a half, the Department conducted field surveys at these sites to obtain site-specific information. With subsequent changes in the law, some applications trickled in after the field visits were conducted. Since legislation has passed in 2004 that will allow more applications to the Fund, further prioritization is on hold so that field surveys can be done on all of the remaining sites at the same time.

## **Indoor Vapor Intrusion**

Traditionally, the Department has evaluated potential health risks that can occur through the mechanisms of groundwater, surface water, and direct contact exposure. In recent years, some scientists have raised concerns that another exposure mechanism, that of indoor vapor exposure, could lead to significant health risks to the general public. The underlying theory behind Indoor Air Intrusion assumes that solvent vapors moving upward from groundwater contamination plumes can enter into buildings through nearly microscopic foundation cracks. Over time, the vapors accumulate in residences and businesses to potentially unhealthy levels. This phenomenon has been noted in more arid and colder regions of the country and is exacerbated by poorly ventilated houses that were built to be “energy-efficient”.

Because drycleaning contamination plumes almost always flow under nearby homes and businesses, this exposure pathway has serious implications for the DCRTF from both prioritization and financial perspectives. Since the prioritization scheme de-emphasizes groundwater contamination in areas of the state where it is not used as a source of drinking water, many potential indoor vapor problems will go untested for years because they are associated with low priority plumes. The actual costs of investigating Indoor Air Intrusion currently run two to five times higher than groundwater samples. The overall Fund costs of investigating and correcting potential Vapor Intrusion problems from drycleaning sites can conceivably add millions of dollars over the costs estimated elsewhere in this document.

Fortunately, there are indications that Indoor Vapor Intrusion may not be as serious a problem in the Southeastern United States as elsewhere in the country. Many of the common building construction types used in this area are unlikely to concentrate the solvent vapors. There are also indications that the amount of rainfall that falls on the state actually prevents most vapors from rising up towards the surface. And, even if a small amount of vapor intrusion does occur in nearby buildings, it is probable that most of the population does not have the extent of exposures that occur in more extreme climates where people tend to stay indoors for longer periods of time.

While it is not known with certainty that indoor air intrusion can lead to significant exposures in the Southeast, DCRTF staff have been on the forefront in investigating this mechanism in this region of the country. DCRTF staff have developed vapor intrusion procedures and computer models that have been cited as the basis for other regulatory programs, both in South Carolina and in other states. Through the experiences gained, DCRTF staff also serve in an advisory capacity to the US EPA and participate with the Interstate Technology Regulatory Council in developing a consistent approach to this problem.

The DCRTF staff will continue to study the exposure potential of this pathway and will take all necessary steps to protect the health and welfare of the citizens of the State. If the developing data shows this to be a problem in the State, then the priorities assigned to the drycleaning sites must be reevaluated to ensure that unacceptable exposures are quickly mitigated.

## **Part II. Site Summaries: Action Funded by the DCRTF**

The Department began field investigations of the drycleaning sites starting in December 1999. Licensed environmental contracting professionals that are overseen by Department personnel do the work. Because the innovative assessment methods developed by the DCRTF requires hands-on decisions in the field, a Department Project Manager is always on-site during the initial phases of investigating the drycleaning sites. In many cases, this may entail several weeks of on-site work before enough data is developed to allow the contractors to proceed on their own.

As is evident from the summaries below, the on-site work has loosely followed the priority list; however, some sites have been skipped in preference for others lower down the list. Some of the skipped sites must meet additional criteria before the Fund can be used for assessment, but the reason many were skipped is to minimize costs to the Fund. The DCRTF can achieve a lower overall cost by assigning all sites in one region of the state to one contractor because the contractor can work on the sites simultaneously. Because of fine subtleties of the scoring system, there often is not a significant difference in the potential health risks of the sites that were assigned priorities ranging between #10 and #60 on the list.

Remediation systems have not been installed in the order of the Priority list. This is because some sites are more complex and time-consuming than others to investigate. Once the full extent of the contamination is fully known, the Department has taken steps to move a site towards remediation as quickly as possible. An extended delay between the site investigation phase and the clean-up phase can grow to be costly as it becomes necessary to repeat much of the investigation data before the remediation system can be installed.



**Remediation has begun at Joye Cleaners in Marion (left) and One Hour Martinizing in Darlington (right)**



**Left: Excavating surface soil at a drycleaning site because of an exposure risk. Most contamination is deeper than can easily be excavated.**

**Right: Direct Push wells are temporary well points pushed in the ground by hydraulic equipment. Direct push rigs can be used in the tight spaces around drycleaning plants.**





**Colonial Cleaners**  
**97 Magnolia Avenue**  
**Denmark**  
**Priority #1**

Assessment	<b>\$ 477,978</b>
Projected Remediation	<b>\$ 607,000</b>
Remediation (Spent to date)	<b>\$ 457,029</b>
Total (Assessment plus Projected Remediation)	<b>\$ 1,085,000</b>

**Status:           Assessment Complete.**  
**Remediation System Installed and Operating.**

The Colonial Cleaners Site has the distinction of being both the highest priority drycleaning site in the state and the most expensive so far. Extensive groundwater contamination has been found that threatens the Town of Denmark's public water supply system. An active remediation system with an ozone sparging system has been installed and is operating.

Colonial Cleaners is a full-service drycleaner and self-service coin laundry that has operated since 1965. It is located in a stand-alone building on the southwest side of the Town of



Denmark. The surrounding properties are light industrial and retail spaces. The facility uses Perchloroethylene (PCE) as the drycleaning solvent. In addition to the usual releases of PCE that occurred at older drycleaning plants, it is known that PCE was sprayed around the exterior of the building to kill weeds. This practice reportedly occurred for many years, potentially allowing a large quantity of PCE to enter the environment.

The Town of Denmark uses local groundwater for its public water supply. The nearest public supply well is located approximately 1400 feet northeast of the site. Two other Denmark public supply wells are located within a mile to the southeast. At the time that the DCRTF investigation began, a shallow well serving a mobile home park was located 1000 feet east of the site. The well in the mobile home park has since been abandoned for reasons unrelated to the drycleaning site.

The geology of this region is among the most difficult in the state to assess. Inter-bedded layers of various sands, clays, porous limestone, and other sediments cause groundwater flow to divert in unexpected directions. Five different groundwater flow directions have been identified in just the top 200 feet of soil underlying the drycleaning site. The contamination is found deeper than can be sampled with direct-push apparatus; therefore, the site was assessed using a mixture of traditional monitoring wells and direct-push methods. These factors have considerably increased costs incurred on this site.

The DCRTF site investigation began in March 2000 and ran through August 2002. The DCRTF assessment included samples collected from 13 direct-push soil profiles, 31 direct-

push groundwater profiles, and 34 permanent monitoring wells installed at depths ranging up to 200 feet deep.

Soil contamination was found around the drycleaning plant; however, there is no direct contact exposure. PCE was found in the sewer lines leading away from the plant, which indicates that solvent was released into the sewer at some time in the past. Contamination in the sewer sediments is not a concern from a human health perspective, but could be a potential source of continuing groundwater contamination.

Two distinct groundwater contamination plumes, moving in different directions, have been identified under the site. The upper plume is found between 40 and 110 feet deep and is moving toward the southeast. It is 300 feet long and 175 wide. The highest concentration of PCE (39,300 ppb) is found under the drycleaning plant. The deeper plume is found between 128 and 145 feet deep and is moving gradually northeast toward a Denmark public supply well. The deeper plume stretches 600 feet from the drycleaning plant and is 420 wide. The deeper plume's maximum concentration of PCE (3840 ppb) is less than that of the upper plume, but still exceeds the Drinking Water Standard by several orders of magnitude.

The public supply well downgradient of the deeper plume has been sampled many times by the DCRTF. This well, known as the Brooker Center well, has shown trace concentrations of PCE. The highest PCE concentration detected so far (1.6 ppb) is below the Drinking Water Standard. Trace levels of other compounds have also been detected in the Brooker Center well. The other compounds are not typically found at drycleaning sites.

The DCRTF conducted a public meeting in Denmark on February 19, 2003 to discuss the various clean-up options available for the site. After evaluating several alternatives, Ozone Sparging was selected for remediation of the groundwater and soil contamination. Contingency plans were developed to inject potassium permanganate into the sewer system in the event that the PCE contamination in the sewer continues to feed the groundwater plume. The selected remedy also includes plans for ozone treatment of the Brooker Center well in the event that the PCE concentration increases above the Drinking Water Standard.

SCDHEC Deputy Commissioner Lewis F. Shaw signed a Record of Decision adopting the remedial plan on April 21, 2003. The total estimated cost of the proposed remedy (\$607,000) includes operation and maintenance costs for the five years that may be needed to clean up the site. The costs do not include the costs to treat the sewer sediments or ozone treat the Brooker Center well, as it is currently thought these additional steps will not be necessary.

Installation of the Ozone Sparging system began in June 2003. Twenty-eight sparge wells were installed in the most heavily contaminated zones. Because of the large number of sparge wells, the site requires two ozone generators that are designed to pump ozone in timed pulses throughout the system. The system is now fully operating after a "shake-down" period fine-tuning its performance.

**Anderson's Cleaners**  
**197 Ireland Creek Road**  
**Walterboro**  
**Priority #2**

Assessment (budgeted)	<b>\$ 101,459</b>
Spent to date	<b>\$ 89,285</b>

**Status:           On-going Assessment**  
**Investigation Suspended Due to Insufficient Funds.**

The Anderson's Cleaner Site is a full-service drycleaner and self-service coin laundry that has operated since 1968. The drycleaner has only used Perchloroethylene (PCE) as the drycleaning solvent. The drycleaning plant is in a stand-alone building adjacent to a grocery. Other nearby land use is predominantly commercial and retail. A large creek is located 400 feet from the drycleaners.

The City of Walterboro uses local groundwater for its public water supply. The nearest public supply well is located less than 200 feet from the drycleaning plant. A regional confining layer should prevent downward migration of contamination to the groundwater supplying the public supply well. No drycleaning solvents or breakdown components have been detected in the public well in periodic testing conducted by the SCDHEC Bureau of Water. There are no known private wells within two miles of the site.

The initial soil sample collected by the drycleaner's contractor did not find contamination in 1997. A subsequent Secondary Assessment overseen by SCDHEC in May 2002 found PCE in the soil and established the site as eligible for the DCRTF.

The DCRTF investigation began in March 2003 and is ongoing. Samples have been analyzed from 9 direct-push soil profiles, 17 direct-push groundwater profiles, 16 temporary wells hand-augured in areas inaccessible to the drill rigs, and 11 permanent monitoring wells. Soil and groundwater contamination have been confirmed but is not completely delineated. Additional testing will be done to determine whether the nearby creek may be impacted

All areas of contaminated soil are covered by asphalt and are not likely to be a direct contact exposure hazard at the site. Preliminary results suggest the drycleaning solvents found in the soil may be a continuing source of groundwater contamination.

The groundwater contamination is initially encountered at depths of four feet. The deepest extent of the contamination has not yet been determined. PCE concentrations of up to 4200 ppb have been detected in groundwater. PCE breakdown components are present at the site, including Trichloroethylene at 6360 ppb, Dichloroethylene at 3720 ppb and Vinyl Chloride at 720 ppb. All exceed the Drinking Water Standard for the respective compounds.

Low levels of drycleaning solvents have been found in the sewer lines leading away from the drycleaning plant. As a result, contamination may be dispersed over a wider area than just at the drycleaning plant itself. Additional groundwater sampling will be conducted to determine if this is the case.

**Former Market Place Cleaners**  
**11 Palmetto Bay Road**  
**Hilton Head**  
**Priority # 3**

Assessment	<b>\$ 146,300</b>
Projected Remediation	<b>\$ 466,353</b>
Remediation (spent to date)	<b>\$ 419,778</b>
Total (Assessment plus Projected Remediation)	<b>\$ 612,653</b>

**Status:**           **Assessment Complete.**  
                          **Remediation System Installed and Operating.**  
                          **Site closure pending.**

The Former Market Place Cleaners will probably be the first drycleaning site cleaned-up by the DCRTF. While the site has not yet been officially pronounced as “clean”, the remediation system can potentially be switched off within the year. The site will be monitored for a few years to ensure that the contaminants levels do not return.

The Market Place Shopping Center was a strip mall on the edge of residential areas of Hilton Head Island. Various companies operated a full-service drycleaning plant at one end of the strip mall from 1974 until 1992. From 1992 to 1999, the location was used as a drycleaning dry-drop store but did not do drycleaning on the premises. Market Place Cleaners is thought to have only used Perchloroethylene (PCE) while in operation.

In 1999, the strip mall was razed and a new shopping center, Islands Crossing, was built in its place. During the process, temporary monitoring wells installed by the developer found groundwater contamination with PCE. Because the site qualified for the DCRTF, the developer was able to continue construction of the shopping center without having to further delineate and remediate the contamination.

The new shopping center includes a mixture of a grocery, small retail shops and restaurants. The surrounding property is retail and residential areas, which are mostly occupied by full time residents of the resort island. Blueprints of the shopping center show the area corresponding to the previous drycleaning plant was covered by four feet of clean fill dirt and asphalted over as the parking area.

The City of Hilton Head uses local groundwater for its public water supply. At the time the DCRTF began investigating the site, a shallow public supply well was located approximately 400 feet southeast of the drycleaning plant location. Since then, the City of Hilton Head has quit using the well because of reasons unrelated to the drycleaning site. The City of Hilton Head continues to supply public drinking water from other wells located within two miles of the site.

The DCRTF investigation was conducted from February 2000 through January 2001. Samples were analyzed from surface water located adjacent to the site, numerous direct push soil and groundwater profiles, and 18 permanent monitoring wells installed by the DCRTF.

A groundwater contamination plume was found extending from the drycleaning plant location into a residential area of Sea Pines Plantation. The highest level of contamination

(27,000 ppb PCE) was found under the approximate location of the old drycleaning machine (based on blueprints of the original strip mall). PCE breakdown components were also found greatly elevated above their Drinking Water Standards. The contamination extended under an area of approximately 100 feet wide and 300 feet long. The contamination was found from the top of the water table (a few feet deep) down to depths of 45 feet.

The groundwater plume did not appear to move towards the nearby public supply well, but instead moves 90° towards the southwest. This finding led to a unique groundwater study to determine if nearby tidal water bodies influenced the flow direction. Special data-loggers were used in the monitoring wells to determine whether tidal fluctuations could affect the movement of the groundwater plume. The data showed that the tides were not affecting the groundwater flow direction. (Note: If the tides affected the flow direction, major modification would be required in the remedial system, increasing the cost of the system.)

The groundwater plume moves in the direction of a drainage canal flowing through the Sea Pines Plantation housing area. Samples collected from the drainage canal found trace levels of PCE breakdown components, but at concentrations lower than regulatory levels set for protection of fishery waters.

Since the contamination is found at relatively shallow depths, the site was also evaluated to determine if drycleaning solvent vapors could build up to potentially harmful concentrations in buildings overlying the contamination plume. Computer modeling shows this is not a viable pathway of exposure for the types of buildings constructed over the plume.

The DCRTF conducted a public meeting in Hilton Head on August 29, 2001 to discuss the various clean-up options available for the site. After evaluating several alternatives, Ozone Sparging was selected for remediation of the worst contaminated groundwater areas. Monitored Natural Attenuation was selected for the lower concentration areas found under the Sea Pines Plantation. A contingency plan was developed that would extend the Ozone Sparging into the Sea Pines Plantation neighborhood in the event that the plume concentrations did not decrease after the highest concentrations areas were remediated.

SCDHEC Deputy Commissioner Lewis F. Shaw signed a Record of Decision adopting the remedial plan on November 5, 2001.

Installation of the Ozone Sparging system was completed by June 2002. Six sparge wells were installed in the most heavily contaminated zone and connected to an ozone generator. The Ozone Sparge system began operation in June 2002 but operated only sporadically during the first several months as “bugs” were worked out of the system. However, even with the ozone sparging system operating intermittently, remarkable decreases of all contaminants were recorded within six months.

The most recent sampling results show that the concentrations have decreased by more than 98%. The plume has shrunk to a fraction of its previous size and no longer extends under the Sea Pines Plantation housing area. It is anticipated that the Ozone Sparging system will be switched off after the next round of samples are collected.

The site will be monitored for a few years to ensure the contaminant levels do not return. During this period, the Ozone Sparging equipment will be left in place on the site and can be reactivated if monitoring shows a rebound in contaminants.

**Curry's Cleaners**  
**1506 Highmarket Street**  
**Georgetown**  
**Priority # 4**

Assessment	<b>\$ 142,661</b>
Interim Action	<b>\$ 40,664</b>
Total Spent to date (Assessment plus Interim Action)	<b>\$ 183,325</b>

**Status: Immediate Removal Action Complete.**  
**Groundwater Assessment Complete.**  
**Remediation Suspended Due to Insufficient Funds.**

Curry's Cleaners is one of the few drycleaning sites to become a high priority for something other than groundwater exposure. The site had a high potential for direct contact exposure because of heavily contaminated soils behind the drycleaning plant. Concentrations of drycleaning solvents in the surface soils were so high that the DCRTF did an immediate removal action before assessing the site further. Since then, groundwater contamination has been delineated; however, further activities are suspended due to a lack of funds.

The Curry's Cleaner site is a full-service drycleaner that has operated since 1968. The drycleaner has only used Perchloroethylene (PCE) as the drycleaning solvent. PCE was stored in an aboveground tank inside the building. Extra PCE was kept behind the building in drums, some of which apparently rusted through. There was also evidence that waste was dumped through the back door onto the soil behind the plant.

The Curry's Cleaner site is located at the end of a small strip mall. A tavern and grill, a grocery store, and a bank use adjacent commercial properties. The rear of the site borders on residential areas. Because the site is barely above sea level, periodic heavy rains cause localized flooding that potentially carried contaminated soil into the residential area.

The DCRTF site investigation began in February 2000. Originally, the DCRTF activities were targeted to delineate the threat from the soil contamination. Two soil areas were found with extremely high levels of contamination that were susceptible to flooding and were readily accessible to the public.

The DCRTF conducted a public meeting in Georgetown on August 9, 2001 to discuss the various clean-up options available to lessen the soil exposure impact of the site. Various innovative technologies were considered that could treat the contamination on-site; however,

conventional excavation with off-site disposal was determined to be the most cost-effective solution.

SCDHEC Deputy Commissioner Lewis F. Shaw signed a Record of Decision adopting the Interim Removal plan on October 8, 2001. Thirty tons of contaminated soil were excavated during the week of January 28, 2002 and removed from the site to an approved landfill.

Groundwater contamination was discovered during the initial DCRTF investigation, but further investigation of the groundwater was delayed until July 2002. The subsequent groundwater investigation ran through May 2003. The investigation included analysis of samples from numerous direct push soil and groundwater profiles, and 27 permanent monitoring wells installed by the DCRTF.

The highest PCE concentration reported in the groundwater is 67,000 ppb. Concentrations of the PCE breakdown components were also found greatly elevated above their respective Drinking Water Standards. Groundwater contamination begins at the top of the water table (5 to 7 feet deep) and reaches to approximately 50 feet below the ground surface. The groundwater plume extends under an area of 800 feet wide by 420 feet long and covers 8 acres.

There are no nearby groundwater wells used for drinking water supply. Remediation of the groundwater plume has been delayed due to insufficient funds.

**Former Thompson Cleaners**  
**218 Bell Street**  
**Bamberg**  
**Priority #5**

Assessment (budgeted)	<b>\$ 10,311</b>
Spent to date	<b>\$ 10,311</b>

**Status: Investigation Suspended due to Insufficient Funds.**

The Former Thompson Cleaners operated as a commercial drycleaner from about 1950 until 1984. The plant was using petroleum-based drycleaning solvents when it stopped operating; however, it is not known if other solvents were ever used. Limited soil testing has found traces of Perchloroethylene (PCE) and Naphthalene, a component of petroleum-based solvents. This suggests that both solvents may have been used at some point.

The Former Thompson Cleaners is located near the center of Bamberg and is surrounded by commercial, retail, and vacant properties. The vacant drycleaning plant building is now boarded up.

The Town of Bamberg uses local groundwater for its public water supply. Three public supply wells are located within 0.2 mile of the drycleaning plant. There may also be private wells within the vicinity.

The initial soil sample collected by the drycleaner's contractor did not find contamination in 1997. A subsequent Secondary Assessment overseen by SCDHEC in May 2002 found PCE and Naphthalene in the soil and established the site as eligible for the DCRTF.

SCDHEC and a contractor visited the site in June 2003 to determine sampling locations; however, further investigation has been suspended due to insufficient funds. Soil and groundwater testing will begin as funds become available.

**Prosperity Cleaners**  
**126 Grace Street**  
**Prosperity**  
**Priority #6**

Assessment	\$ 73,549
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**Status: Assessment Complete.**  
**Project Referral to the SCDHEC Underground Storage Tank Program.**

Prosperity Cleaners is a full-service drycleaner that has only used Stoddard (petroleum-based) solvent since it began operation in 1947. The DCRTF investigation found petroleum components in groundwater near the site. The contamination appears to be the result of leaking underground storage tanks at an old gas station unrelated to the drycleaning facility. The project will be transferred to the SCDHEC Underground Storage Tank Program for further evaluation.

The drycleaning facility is located near the center of Prosperity. Nearby land is used as retail and residential properties.

The Town of Prosperity uses local groundwater for its public water supply. Two public supply wells are located within a quarter mile of the drycleaning plant but are outside the contamination plume. No private wells are known within the plume area or downgradient of any contamination.

The DCRTF site investigation began in May 2001 and was completed in November 2002. Because of the nature of the geology in the region, direct push sampling techniques could not be used. Instead, traditional monitoring wells had to be drilled in multiple phases over several months. Four groundwater monitoring wells were installed in May 2001. Based on the results from the wells, three additional wells were installed in July 2002.

The monitoring wells found levels of petroleum components (notably benzene at 1200 ppb, exceeding its Drinking Water Standard of 5 ppb). Since these compounds can result from certain petroleum-based drycleaning solvents, an attempt was made to collect samples for chemical forensic "fingerprinting" testing. Chemical fingerprinting could not be performed on the samples; however, it appears that the groundwater plume is caused by another source other than the drycleaning plant. Based on the location of the contamination, it can be concluded that the plume originates from a previously undocumented underground tank at a gas station that used to be near the drycleaning plant.



The DCRTF will conduct a meeting in Prosperity to review the drycleaner site findings with the public.

**Edwards Cleaners**  
**208 Rosemary Street**  
**Williston**  
**Priority # 7**

Assessment	<b>\$ 490,356</b>
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**Status:           Assessment Complete.**  
**Remedial Options to be evaluated as Funding becomes available.**

The Edwards Cleaners site has the largest groundwater contamination plume of any the drycleaning sites investigated by the DCRTF thus far. The plume stretches nearly a mile from the drycleaning plant and covers an area of more than 120 acres. Various remedial options must be evaluated before proceeding further with site activities. In all likelihood, a combination of several innovative technologies will have to be used to deal with such a large contamination plume. The overall cost of the site may easily exceed one million dollars.

Three different companies have operated the drycleaning plant since it began in 1953, with Edwards Cleaners operating it for only the past ten years. The previous owners used Perchloroethylene (PCE) in one drycleaning machine and Stoddard (a petroleum-based solvent) in a second machine. Reportedly, the PCE drycleaning machine was a “transfer” machine and used a separate stand-alone dryer. An aboveground PCE storage tank was located outside the plant. All PCE-using equipment was removed before Edwards Cleaners began operating and the plant has only used Stoddard solvent since.

Edwards Cleaners is located in stand-alone building on the south edge of the Town of Williston. All of the surrounding properties are residential, with the exception of an adjacent retail propane supplier.

The Town of Williston uses local groundwater for its public water supply. The nearest public supply well is located approximately 2000 feet northeast of the site. Residential areas south of the town use private wells for drinking water and irrigation water supply.

The DCRTF investigation began in April 2001 and ran through October 2003. The contamination is found deeper than can be sampled with direct-push apparatus; therefore, the site was assessed using a mixture of traditional monitoring wells and direct-push methods. Hundreds of soil and groundwater samples have been collected and analyzed from 57 direct push profiles and 59 permanent monitoring wells installed by the DCRTF.

Groundwater contamination occurs from approximately 30 feet to 100 feet deep. The highest concentrations of PCE (5800 ppb) are encountered immediately below the drycleaning plant. The plume covers an area by 1100 feet wide by 4800 feet long (120 acres).

The groundwater plume has moved towards the south and is unlikely to influence the public supply wells used by Williston. Eight private wells near the southern fringe of the plume have been sampled. One private well has been found to contain 100 ppb of PCE. While this concentration is above the Drinking Water Standard (5 ppb), the well is only used for irrigation water and the contamination does not interfere with use of the well for irrigation. Construction records for the other private wells (which supply drinking water) show they are deeper than the contamination has reached so far.

A creek flowing through the area shows low concentrations of PCE. The levels are just slightly above the regulatory levels set for protection of fishery waters. No PCE has been detected further downstream in the actual fishery area.

Even though it has been many years since PCE was last used at the drycleaning plant, there are almost no PCE breakdown components found in the plume. This indicates that the plume will not naturally degrade unless an engineered remedy is installed to hasten the process.

A public meeting was held at the Williston Town Hall on March 6, 2004 to inform the public about the extent of the groundwater contamination from the Edwards Cleaners site even though a remedy has not yet been selected for the site. Various remedial options will be evaluated and presented in another public meeting in Williston before proceeding further.

**One Hour Martinizing  
409 Pearl Street  
Darlington  
Priority #8**

Assessment	<b>\$ 176,701</b>
Projected Remediation	<b>\$ 258,000</b>
Remediation (Spent to date)	<b>\$ 231,225</b>
Total (Assessment plus Projected Remediation )	<b>\$ 434,700</b>

**Status:           Assessment Complete.  
                      Remediation System Installed.**

The One Hour Martinizing site has a diffuse groundwater contamination plume with a slight impact to a small creek due to discharge of contaminated groundwater. The site is currently undergoing groundwater remediation using Potassium Permanganate injection. Contaminated soils have also been removed to reduce the potential exposure to contamination.

The One Hour Martinizing facility is a full-service drycleaner that uses Perchloroethylene (PCE) and petroleum-based solvents. Various companies have operated it since 1965. The current facility operator uses PCE in two dry-to-dry machines and petroleum-based solvent in one dry-to-dry machine.

The One Hour Martinizing Site is located in a stand-alone building in a small shopping center near the center of Darlington. The surrounding area is a mixture of commercial, town government, retail, and residential areas.

The Town of Darlington uses local groundwater for its public water supply. The nearest public supply well is located approximately 1500 feet to the east. There are no known private wells within a 2-mile radius of the site.

The DCRTF site investigation was conducted in phases from May 2001 through March 2002. Samples have been analyzed from 14 direct push profiles and 23 permanent monitoring wells installed by the DCRTF.

A groundwater contamination plume has been delineated moving from the drycleaning plant to a small creek northwest of the site. This flow direction is away from the public supply wells. The contaminant plume is approximately 800 feet long by 150 feet wide. An underlying clay layer restricts the downward movement of the plume to only 24 feet deep. The highest concentration of PCE in the plume (180 ppb) is found underlying the drycleaning plant. Most of the plume area has concentrations less than 50 ppb. These concentrations are above the Drinking Water Standard, but the level of contamination is considerably less than encountered at most of the other drycleaning sites the DCRTF has investigated.

Levels of PCE were found in the small creek. The levels are lower than regulatory levels set for protection of fishery water bodies. The creek leads to a stream used for fishing. No PCE was detected downstream in the creek closer to the fishery area.

Soil was sampled behind the drycleaning plant in an unpaved area that formerly was the location of a solid waste dumpster. PCE concentrations (150,000 ppb) exceeding the levels set for industrial exposure in soil were found. Sewer lines leading away from the drycleaner have been impacted with PCE.

The DCRTF conducted a public meeting in Darlington on October 22, 2002 to discuss the various clean-up options available for the site. After evaluating several alternatives, Potassium Permanganate Injection was selected for remediation of the groundwater contamination plume. Excavation and off-site disposal was selected for the area of soil contamination. The remedial plan includes a provision to remove the PCE from the sewer lines if groundwater concentrations do not reduce after injection of the Permanganate. A contingency plan is also included that would remove PCE from the small creek with an air-bubbling system in the event that the groundwater remediation causes the PCE to increase in the fishery portion of the creek.

SCDHEC Deputy Commissioner Lewis F. Shaw signed a Record of Decision adopting the remedial plan on January 6, 2003.

Remediation activities began in June 2003. Ninety tons of contaminated soil was removed from the rear of the plant and the area was covered over by clean fill dirt. The first round of Potassium Permanganate was injected via direct push injection points throughout the

groundwater plume. Groundwater monitoring has shown some reduction in the contaminant levels on the site; however, there has not yet been enough time for all of the Potassium Permanganate to react with the contamination. It is not known if additional injections will be needed before the site can be closed out.

**Knightsville Cleaners**  
**1580 Central Avenue**  
**Summerville**  
**Priority #9**

Assessment	\$ 81,019
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**Status:           Assessment Complete.**  
**Remediation Suspended Due to Insufficient Funds.**

The Knightsville Cleaners is a full-service drycleaner that has been operating since approximately 1969. The drycleaner has only used Perchloroethylene (PCE) as the drycleaning solvent. The extent of the contamination has been determined; however, further activities are suspended due to a lack of funds.

The drycleaning plant operates in the end unit of a small strip office/retail building in the Knightsville community on the outskirts of Summerville. The drycleaning plant is adjacent to a small restaurant. Nearby land is used as an auto body shop, fire station, rural farm fields, and residential areas. The rear of the drycleaning plant borders on a freshwater wetlands and small creek.

The Dorchester County Water Authority uses local groundwater for public supply. The nearest public supply well is located less than 900 feet from the drycleaning plant. Mobile home parks in the vicinity are also known to have their own shallow wells for drinking water supply. There may be private wells within two miles of the drycleaning plant, but none are known within the contamination zone.

The DCRTF site investigation was conducted from October 2001 through April 2003. The investigation analyzed samples from surface water adjacent to the site, numerous direct push soil and groundwater profiles, and 17 permanent monitoring wells installed by the DCRTF.

A small groundwater contamination plume has been delineated moving from the drycleaning plant into the freshwater wetlands area. The plume covers an area of approximately 80 feet by 200 feet (.37 acres). The contamination is found from the top of the water table (5 feet deep) down to 36 feet deep. A confining layer of marl at 36 feet appears to be intact. This marl seems to be preventing the spread of the contamination into the deeper zone used by the nearby public well. The highest PCE concentration (500 ppb) is detected under the wetlands. PCE breakdown components have also been detected, indicating that natural sediments in the wetlands may be aiding the PCE breakdown.

Characterization of the groundwater plume is complete. Further action on the site has been suspended due to insufficient funds.

**Belvedere Cleaners**  
**502 Clearwater Road**  
**Belvedere**  
**Priority # 10**

Assessment (budgeted)	<b>\$ 8,283</b>
Spent to date	<b>\$ 8,283</b>

**Status: Investigation Suspended due to Insufficient Funds.**

The Belvedere Cleaners has been operating as a commercial drycleaners since 1964. The facility has only used Stoddard, a petroleum-based drycleaning solvent. The Belvedere Cleaners is located on the outskirts of Belvedere. The area surrounding the cleaners is residential and commercial.

The Town of Belvedere uses local groundwater for its public water supply. A public supply well is located within 0.3 mile of the drycleaning plant. There may also be private wells within two miles of the site, but none are known within the immediate vicinity.

The initial soil sample collected by the drycleaner's contractor did not find contamination in 1997. A subsequent Secondary Assessment overseen by SCDHEC in May 2002 found petroleum-based solvents in the soil and established the site as eligible for the DCRTF.

SCDHEC and a contractor jointly visited the site in June 2003 to determine sampling locations; however, further investigation has been suspended due to insufficient funds. Soil and groundwater testing will resume when funds become available.

**Color Craft Cleaners**  
**9008 Marlboro Avenue**  
**Barnwell**  
**Priority #11**

Assessment	<b>\$ 50,891</b>
Projected Remediation	<b>\$ 10,901</b>
Remediation (spent to date)	<b>\$ 4,013</b>
Total (Assessment plus Projected Remediation)	<b>\$ 61,792</b>

**Status: Assessment Complete.**  
**No Remediation System Required.**  
**Site to be Monitored for Three Years.**

The Color Craft Cleaners has operated as a drycleaners since 1969. The facility has only used Stoddard, a petroleum-based drycleaning solvent. The DCRTF investigation identified a small contamination plume on-site, but it does not move to other areas. The DCRTF will continue to monitor the groundwater at the site for three years. It is anticipated that a "No Further Action" designation will be given to the site at that time unless the groundwater conditions change.

The Color Craft Cleaners is located on the outskirts of Barnwell. The area surrounding the cleaners is residential and commercial.

The Town of Barnwell uses local groundwater for its public water supply. Four public supply wells are located within 0.5 mile of the drycleaning plant. There may also be private wells nearby.

The DCRTF investigation was completed using a combination of four direct-push profiles followed by installation of five permanent groundwater monitoring wells.

Low concentrations of Perchloroethylene (PCE) were detected in groundwater; however, the concentrations were below the Drinking Water Standard. Since PCE has not been used as a drycleaning solvent in the plant, it is thought to present in the groundwater because it is a common ingredient of some spotting agents used by drycleaners (to get difficult stains out of garments). Analysis of deep soils from the site shows the presence of Stoddard solvents but the Stoddard solvents are not found in the groundwater. It appears that the underlying soils have effectively bound up the Stoddard contamination, preventing it from moving off-site.

The DCRTF conducted a public meeting in Barnwell on November 14, 2002 to discuss the investigation findings and outline a plan to monitor the site for three years to ensure that the contamination is not moving off-site. SCDHEC Deputy Commissioner Lewis F. Shaw signed a Record of Decision adopting the monitoring plan on April 14, 2003.

**Joye One Hour Cleaners**  
**1017 Godbold Avenue**  
**Marion**  
**Priority #12**

Assessment	<b>\$ 317,985</b>
Projected Remediation	<b>\$ 468,000</b>
Remediation (spent to date)	<b>\$ 48,484</b>
Total (Assessment plus Projected Remediation)	<b>\$ 785,985</b>

**Status:**           **Assessment Complete.**  
                          **Remediation System Partially Installed but not yet Operating.**

The Joye One Hour Cleaners illustrates the complexity that occurs when sewer lines become involved in spreading the contamination from a drycleaning site. The site is also unusual from an assessment standpoint because it became necessary to test nearby buildings to determine if drycleaning vapors could accumulate inside the buildings. The contamination plume has now been fully delineated. An Ozone Sparging system has recently been installed and is the final stages of testing before it can become fully operational.

The Joye One Hour Cleaners is a full-service drycleaner that began operating in the early 1970's. The facility uses Perchloroethylene (PCE) as the drycleaning solvent. Joye One Hour Cleaners is located in a stand-alone building in Marion. Nearby land is as commercial, light industrial, retail, food service, and residential properties.

The City of Marion uses local groundwater for its public water supply. The nearest public supply well is approximately 0.4 mile from the drycleaning plant. Six other public supply wells used by Marion are located within 1½ mile. Private wells scattered throughout the area may potentially be used as a source of drinking water. Three private wells found close to the site are only used for irrigation water supply.

The DCRTF investigation was conducted from June 2001 through February 2003. Hundreds of samples have been analyzed from 20 direct-push soil profiles, 34 direct-push groundwater profiles, 36 permanent monitoring wells installed by the DCRTF, 6 nearby monitoring wells, 3 private irrigation wells and numerous sewer and stormwater access points.

Significant concentrations of PCE were detected in the soil and groundwater around the drycleaning plant. High concentrations of PCE (31,600 ppb) in the groundwater near the drycleaning plant show that releases occurred there, however, the highest PCE concentration (62,900 ppb) was found more than 300 feet away. To further complicate the assessment picture, the highest concentration was found in an opposite direction from where groundwater flow could carry contamination from the drycleaning plant. After an evaluation of the sewer system, the sewer lines were found to be broken near the area with the highest PCE concentration. Apparently, drycleaning solvents released into the sewer system years ago have leaked out to the underlying soil from the break. The contaminated soil creates an additional source area that contaminates the groundwater. The two plumes join together to form one plume that is approximately 650 feet long and 600 feet wide. Contamination across the 12-acre plume is found down to 45 feet deep.

Because of the elevated concentrations found at shallow depths, the site was evaluated to determine if drycleaning solvent vapors could build up to potentially harmful concentrations in buildings overlying the contamination. Results of soil-gas testing and interior building samples indicate that drycleaning vapors are not permeating into the buildings. An additional round of sampling will be performed later to confirm this.

The DCRTF conducted a public meeting in Marion on March 20, 2003 to discuss the various clean-up options available for the site. After evaluating several alternatives, Ozone Sparging was selected for remediation of the groundwater and soil contamination. Removal of the sewer sediments is not thought to be necessary to achieve the clean-up goals; however, contingency plans were developed to excavate the sewer sediments in the event that the sediments continue to feed the groundwater plume.

SCDHEC Deputy Commissioner Lewis F. Shaw signed a Record of Decision adopting the remedial plan on May 19, 2003.

The total estimated cost of the proposed remedy (\$468,000) includes operation and maintenance costs for the five years that may be needed to clean up the site. The costs do not include the costs to treat the sewer sediments, as it is currently thought this additional step will not be necessary.

The remediation system is currently undergoing installation. Because of the size of the contamination plume, the site requires two ozone generators and a large number of sparge wells. The Ozone Sparging System has not yet been placed into fully operational mode.

**Main Street Cleaners  
208 North Main Street  
Marion  
Priority #13**

Assessment	<b>\$ 167,764</b>
Projected Remediation	<b>\$ 70,868</b>
Remediation (spent to date)	<b>\$ 0</b>
Total (Assessment plus Remediation)	<b>\$ 238,632</b>

**Status:           Assessment Complete.  
                      Monitored Natural Attenuation  
                      Project Referred to SCDHEC Underground Storage Tank Program.**

The Main Street Cleaners is a full-service drycleaner that has only used Stoddard (petroleum-based) solvent since it began operation in 1940; however, Perchloroethylene (PCE) has also been detected in on-site samples. Extremely high concentrations of petroleum components were found in groundwater near the site. Chemical forensic analysis shows the petroleum components probably result from leaking underground storage tanks at an old gas station site adjacent to the drycleaning plant. The project has been referred to the Underground Storage Tank Program (UST) for further evaluation. The DCRTF will continue to monitor the site for the next three years to ensure that the UST program activities do not significantly alter the geo-chemistry of the site (which could cause the drycleaning contaminants to reappear if they are being masked by the petroleum compounds).

The drycleaning plant is located near the center of Marion. The drycleaning plant is at one end of a small retail building. Various businesses, a bank, a gasoline station, and residential areas occupy nearby properties.

The City of Marion uses local groundwater for its public water supply. The nearest public supply well is approximately 0.3 mile from the drycleaning plant. Six other public supply wells used by Marion are located within 1½ mile. Private wells may be scattered throughout the area and may potentially be used as a source of drinking water.

The DCRTF site investigation began in May 2001 and was completed in November 2002. Samples have been analyzed from four hand-augured soil borings, eight direct-push groundwater profiles, and 24 permanent monitoring wells installed by the DCRTF.

Low concentrations of PCE were found in groundwater samples collected early in the DCRTF investigation but have not been found since. Concentrations of the petroleum-related compounds Benzene (512 ppb) and Toluene (1910 ppb) were found in excess of their respective Drinking Water Standards. Samples of petroleum compounds from the wells were subjected to chemical forensic “fingerprint” testing. Based on the chemical fingerprinting and the location of the contamination, it is concluded that the groundwater plume is the result



of leakage from a previously unknown underground storage tank at a gas station that used to be near the drycleaning plant.

The DCRTF conducted a public meeting in Marion on August 12, 2004 to discuss the various options available for the site. While the SCDHEC UST program will address the old gas station petroleum tanks, the DCRTF will retain responsibility over the drycleaning portion of the site. Since there is a possibility that the petroleum leaks may mask finding contamination from the drycleaning plant, the DCRTF will monitor the site for three years (after the UST program has had time to remediate the petroleum leaks.) The site will be closed out if no further drycleaning contamination is found at that time.

SCDHEC Deputy Commissioner Robert King signed a Record of Decision adopting the remedial plan on Oct. 11, 2004.

**Becknell Cleaners**  
**201 North Congress Street**  
**Winnsboro**  
**Priority #15**

Assessment	\$ 237,237
Projected Remediation	\$ 550,000
Remediation (spent to date)	\$ 0
Total (Assessment plus projected Remediation)	\$ 787,237

**Status:**           **Assessment Complete.**  
                          **Remedy Selected.**  
                          **Remedial Design cannot begin Due to Insufficient Funds.**

The Becknell site has the distinction of having the highest concentration of drycleaning solvents found in groundwater of any of the drycleaning sites investigated thus far by the DCRTF. There are indications that a pool of drycleaning solvents may underlie the site. To complicate the site further, the contamination has entered the fractured bedrock aquifer. This will be exceedingly difficult, and potentially expensive, to remediate. A remedial option has been selected; however, there are insufficient funds to proceed with its implementation.

Becknell Cleaners started operating in 1970 as Cale's Cleaners. It used Perchloroethylene (PCE) until switching to a petroleum-based solvent in 1995. An area of soil used for contaminated muck disposal appears to be a major source for the contamination; however, the data also suggests that solvent most likely seeped though the floor of the plant near the drycleaning machine.

The site is located near the center of Winnsboro. Residences, a church, gas station, and various retail enterprises occupy adjacent properties. Most of the surrounding population uses public water supplied by Winnsboro from surface water intakes located miles away from the drycleaning plant. There is limited use of groundwater near the site. There may be private wells within two miles of the drycleaning plant, but none are known within the contamination zone.

**Sampling Groundwater  
with a Track-Mounted  
Direct Push Rig**



Initially, the site was of concern because the muck disposal area is uphill of several houses. There was a concern for human exposure because rain runoff could conceivably carry contamination down into people's yards. Testing conducted during the DCRTF investigation shows this is not occurring and there is no potential health threat via this mechanism.

The DCRTF investigation began in November 2001. This work began with the installation of shallow permanent groundwater wells and collection of shallow and deep soil samples. Because the regional geology prevents use of direct push apparatus, conventional monitoring wells had to be installed over several phases (November 2001, April 2002, January 2003).

A PCE concentration of 160,000 ppb was detected in the groundwater immediately below the plant. This concentration is the maximum amount of PCE that can dissolve into water. This high concentration, along with other elevated concentrations downgradient of the plant, suggests that there is a large underground pool of PCE that is continuing to feed the groundwater contamination. The data also shows that the PCE is not degrading naturally since only low levels of a breakdown component, Trichloroethylene (TCE) have been found.

Groundwater appears to flow in two directions from the drycleaning plant. The major component of the groundwater flow moves northeast to a small creek approximately 800 feet away. This highly concentrated plume is found between 25 and 118 feet deep and intrudes at least 50 feet into the bedrock fractures. A relatively dilute portion of the plume splits off at the plant and flows approximately 150 feet towards the southwest. The total area impacted by the contamination is approximately 8 acres.

Surface water and sediment samples were collected from the creek northeast of the plant. The concentrations of PCE (1,400 ppb) and TCE (42 ppb) in the creek exceed regulatory levels set for protection of fishery waters. No detectable concentrations were found further downstream in areas that may actually be used for fishing.

The DCRTF conducted a public meeting in Winnsboro on October 19, 2004 to discuss the various remedial options available for the site. After evaluating several alternatives, Air Sparging with Soil Vapor Extraction was selected for bulk removal of the pool of drycleaning solvents from the top of the bedrock under the site. This will be followed up with Potassium Permanganate injections to treat the residual groundwater contamination plume. Since it is possible that the Air Sparging process will drive higher concentrations of PCE to the stream north of the site, an air-bubbler system will be installed in the stream to prevent PCE from flowing to the fishery area of the creek.

The Record of Decision adopting the remedial plan has not yet been finalized.

**Belton One Hour Cleaners**  
**420 South Main Street**  
**Belton**  
**Priority #16**

Assessment	\$ 221,487
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**Status:           Assessment Complete.**  
**Remediation Suspended Due to Insufficient Funds.**

The Belton One Hour Cleaners is a full-service drycleaner that has been operating since November 1971. The drycleaner has only used Perchloroethylene (PCE) as the drycleaning solvent. The extent of the contamination has been determined; however, further activities are suspended due to a lack of funds.

The Belton One Hour Cleaners is located on the end of a small strip mall. Adjacent businesses are primarily retail and food establishments. The rear of the strip mall borders on a railroad track separating it from an industrial manufacturing complex and undeveloped commercial property.

Groundwater is not used locally for public water supply. No private wells are known within the plume area or downgradient of any contamination.

The DCRTF site investigation began in November 2001 and was completed in July 2002. Samples were analyzed from 31 direct-push groundwater profiles and 37 monitoring wells installed by the DCRTF.

Low concentrations of PCE were detected in the groundwater in the immediate vicinity of the drycleaning plant. Sewer lines leading away from the drycleaner are impacted by releases of PCE that occurred before regulation. Innovative soil-gas sampling was used to assist in finding potential release points from the sewer line. Using this method, three separate groundwater contamination plumes were found starting at breaks in the sewer lines. All three plumes are relatively dilute (highest PCE concentration 215 ppb) and shallow (occurring from 20 to 59 feet deep). One plume is approximately 250 feet long by 150 feet wide, the second is 400 feet long by 150 feet wide, and the third is 200 feet long by 125 feet wide. Because the sewer line doubles back through the industrial property behind the drycleaning plant, all of the plumes are located within a few hundred feet of the plant and flow into the industrial area.

Remediation of the groundwater plumes has been suspended due to insufficient funds.



**Use of a large diameter drill auger to install a conventional monitoring well at a drycleaning site. The dirt brought up to the surface must be collected for disposal as a hazardous waste.**

**DeLuxe Cleaners**  
**19 Mill Street**  
**Williamston**  
**Priority #17**

Assessment (budgeted)	<b>\$84,119</b>
Assessment (Spent to date)	<b>\$70,819</b>
Projected Remediation	<b>\$27,000</b>
Total (Assessment plus Projected Remediation)	<b>\$101,119</b>

**Status:**           **Assessment Complete.**  
                         **No Remediation System Required.**  
                         **Site to be Re-tested after Five Years.**  
                         **Project Referred to SCDHEC Underground Storage Tank Program.**

DeLuxe Cleaners is a full-service drycleaner that has only used Stoddard (petroleum-based) solvent since it began operation in 1945. Petroleum components were found in groundwater near the site. Chemical forensic analysis shows the petroleum components probably result from leaking underground storage tanks at an old gas station unrelated to the drycleaning plant. The project has been referred to the SCDHEC Underground Storage Tank (UST) Program for further evaluation. The DCRTF will re-test the site in five years to ensure that the gas station leak has not obscured finding contamination from the drycleaning site.

The drycleaning plant is located near the center of Williamston. Nearby properties include a church, a post office, a car detailing shop, a childcare facility and several residences.

Groundwater is not used locally for public water supply. No private wells are known within the plume area or downgradient of any contamination.

The DCRTF site investigation began in August 2001 and was completed in July 2002. Funded activities included analysis of soil and groundwater samples from seven direct-push profiles in November 2001. Based on the preliminary results, four groundwater monitoring wells were installed in February 2002. Four additional wells were installed in June 2002. The wells were sampled in July 2002 and again in June 2003.

The monitoring wells found levels of three petroleum components Benzene (358 ppb) and Ethyl-Benzene (1040 ppb) exceeding their respective Drinking water Standards. Since these compounds can result from petroleum-based drycleaning solvents, samples of petroleum components from the wells were subjected to chemical forensic “fingerprint” testing. Based on the chemical fingerprinting and the location of the contamination, it is concluded that the groundwater plume is attributable to a previously unknown underground storage tank at a gas station that used to be near the drycleaning plant.

As part of the DCRTF investigation, liquids and sediments were also collected from the sewer system. There does not appear to be any significant spread of drycleaning solvents via this mechanism. There also are no nearby surface water bodies that can be affected by the site.

The DCRTF conducted a public meeting in Williamston on September 21 2004 to review the drycleaning site findings with the public. While the SCDHEC UST program will address the old gas station petroleum tanks, the DCRTF will retain responsibility over the drycleaning portion of the site. Since there is a possibility that the petroleum leaks may mask finding contamination from the drycleaning plant, the DCRTF will retest the site in of five years (after the UST program has had time to remediate the petroleum leaks.) The site will be closed out if no drycleaning contamination is found at that time.

SCDHEC Deputy Commissioner Robert King signed a Record of Decision adopting the remedial plan on November 1, 2004.

**Former Advance Cleaners**  
**55 New Orleans Road**  
**Hilton Head**  
**Priority #18**

Assessment (Budgeted)	<b>\$ 89,119</b>
Spent to date	<b>\$ 89,080</b>

**Status:           Assessment Complete.**  
**Remediation Suspended Due to Insufficient Funds.**

Advance Cleaners operated as a drycleaners in this location from 1983 to 1991. The drycleaner used Perchloroethylene (PCE) as the drycleaning solvent. The extent of the contamination has been determined; however, further activities are suspended due to a lack of funds.

The Former Advance Cleaners was located in a small mixed-use business and retail center. The unit occupied by the drycleaner has been retrofitted into a restaurant and nothing remains of the former drycleaning operation. The area surrounding the Former Advance Cleaners is a mixture of commercial, retail, medium-density residential, and golf courses.

The City of Hilton Head uses local groundwater for its public water supply. At the time the DCRTF began investigation of the site, the nearest public supply well was located approximately 0.3 mile to the northwest. Since then, the City of Hilton Head has quit using the well for reasons unrelated to the drycleaning site. The City of Hilton Head continues to supply public drinking water from other wells located within two miles of the site.

In the early-1990's, an independent environmental assessment conducted on the behalf of the property developer found low concentrations of drycleaning solvents in groundwater underlying a portion of the site. Groundwater monitoring wells were installed and monitored at the developer's expense. These wells generally showed inconsequential levels of contamination.

The DCRTF investigation began in July 2002 and was completed in July 2003. Activities included analysis of soil and groundwater samples from 2 direct-push soil profiles, 18 direct-push groundwater profiles, 7 monitoring wells previously installed by the developer and 8 new monitoring wells installed by the DCRTF. Samples were also collected along the water drainage pathway to determine if nearby ponds were affected by the site.

In addition to PCE, many of the samples contained the PCE breakdown compounds Trichloroethylene (TCE), Dichloroethylene (DCE), and Vinyl Chloride (VC). The surface water samples had low detections of PCE, TCE, and DCE that were lower than regulatory levels set for protection of fishery water bodies. A small groundwater contaminant plume has been delineated at shallow depths ranging between 8 and 20 feet deep. The monitoring wells installed by the DCRTF show concentrations of PCE (40 ppb), TCE (189 ppb), and VC (3 ppb) above the Drinking Water Standard. These compounds are not detectable in the monitoring wells originally installed by the developer. These findings suggest the original wells have been placed too far apart or at the wrong depths to adequately detect the groundwater plume.

Even though natural breakdown of PCE is occurring, the levels of groundwater contaminants are unlikely to meet regulatory levels without an engineered remedial intervention. Remediation of the groundwater plume has been suspended due to insufficient funds.

**Sixty Minute Cleaners**  
**635 West Carolina Avenue**  
**Hartsville**  
**Priority #19**

Assessment (Budgeted)	<b>\$ 100,989</b>
Spent to date	<b>\$ 100,989</b>

**Status: Ongoing Assessment.**  
**Further Investigation Suspended due to Insufficient Funds.**

Sixty Minute Cleaners began operating as Cale's Cleaners in 1968. It has used Perchloroethylene (PCE) as the drycleaning solvent until 1999, when the plant switched to a petroleum-based solvent.

Sixty Minutes Cleaners is located in a stand-alone building on the western edge of Hartsville. The area surrounding the plant is predominately residential with the exception of businesses located along West Carolina Avenue.

Groundwater is used locally for public water supply by the City of Hartsville. The nearest public supply well is approximately 0.5 mile southwest of the drycleaning plant. Two other city wells are located within two miles of the plant. Private wells have been found near the drycleaning plant, but are reportedly only used for irrigation.

The DCRTF site investigation began in March 3, 2003 and is on-going. Preliminary data developed with direct-push apparatus shows a groundwater contamination plume extending approximately 1000 feet to the north of the plant. The groundwater plume is at least 550 feet wide and reaches to 92 feet deep. Five private wells in this area were also sampled to assist in determining the plume boundaries. The private wells are only used for irrigation. Ten permanent monitoring wells have been installed by the DCRTF, but the drycleaning plume apparently extends beyond the monitoring wells. More monitoring wells are needed to complete delineation of the groundwater contamination.

The groundwater plume flows to a small lake, Lake Presswood. Preliminary data does not show an impact to Lake Presswood.

Further investigation of the contamination has been suspended due to a lack of funds.

**One Hour Cleanerizing**  
**417 Georgia Avenue**  
**North Augusta**  
**Priority #20**

Assessment Cost (budgeted)	<b>\$ 99,174</b>
Spent to date	<b>\$ 99,174</b>

**Status: Ongoing Assessment.**  
**Further Investigation Suspended due to Insufficient Funds.**

One Hour Cleanerizing has been used as a drycleaning facility since 1961 and is only known to have used Perchloroethylene (PCE) as the drycleaning solvent.

The One Hour Cleanerizing plant is in a stand-alone building near the center of the City of North Augusta. The surrounding properties are commercial and residential.

Groundwater contamination with PCE was documented under adjacent properties in 1997 during an environmental assessment performed as part of a municipal redevelopment of the downtown area. The City of North Augusta supplies drinking water to its residents from a surface water intake located upriver of the site. Groundwater is used locally by some small public water systems. Several mobile home parks located approximately 1.5 miles east of the site supply their own water from small public supply wells. Private wells may also be located in the vicinity.

The DCRTF investigation began in August 2002. Soil and groundwater contamination have been confirmed through direct-push sampling and field screening methods. Further delineation of the groundwater contamination must be done with a monitoring well network.

Samples of surface water collected from groundwater-fed springs have been tested for the presence of drycleaning solvents. PCE has been detected at three separate springs. The concentrations are below Surface Water Criteria for protection of a fishery, but the detections indicate extensive groundwater contamination. Based on the preliminary data, the

groundwater contamination plume extends approximately 1500 feet in two directions from the drycleaning plant and potentially contaminates at least 25 acres of groundwater.

Further assessment with permanent monitoring wells must be conducted. Preliminary indications of the size the groundwater contamination suggests an extensive monitoring well network will be necessary for the site.

**Professional Cleaners**  
**1131 West Greene Street**  
**Cheraw**  
**Priority #21**

Assessment (budgeted)	<b>\$ 74,853</b>
Spent to date	<b>\$ 69,290</b>

**Status:           Assessment Complete.**  
**Remediation Suspended Due to Insufficient Funds.**

Professional Cleaners is a full-service drycleaning facility that has only used Perchloroethylene (PCE) since it began in 1989. The extent of the contamination has been determined; however, further activities are suspended due to a lack of funds.

Professional Cleaners is located at one end of a small shopping center strip mall. The area surrounding the drycleaning plant is a mixture of industrial manufacturing, retail, food service, and residential properties.

Most of the surrounding population uses public water supplied by Cheraw from surface water intakes located miles away from the drycleaning plant. Several mobile home parks located between one to two miles away use groundwater for drinking water supply. Private wells may possibly be located in the vicinity, but none are known within the contamination zone.

The DCRTF investigation began in July 2002 and was completed in November 2003. Soil and groundwater samples were analyzed from direct-push points and from 11 monitoring wells installed by the DCRTF. A small groundwater contamination plume (approximately 320 feet long by 200 feet wide) has been delineated. The contamination is limited to a depth of 20 feet. The maximum concentration of PCE in groundwater (1300 ppb) appears to be concentrated directly under the drycleaning plant.

The site does not present an exposure mechanism via soil or surface water pathways. The site investigation has progressed to the point such that various remedies can be explored to remediate the groundwater plume; however, further activities have been suspended due to insufficient funds.



**Dryclean USA #305**  
**425 Johnnie Dodds Blvd.**  
**Mount Pleasant**  
**Priority #22**

Assessment
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\$258,661
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**Status:           Assessment Complete.**

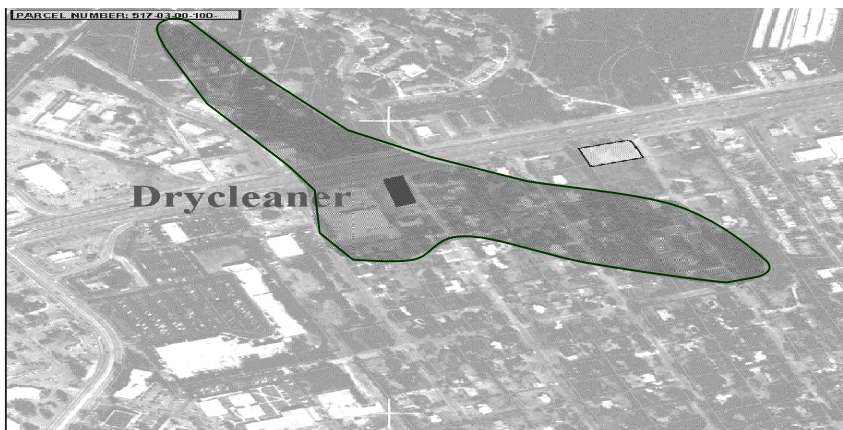
The Dryclean USA #305 is a full-service drycleaner that has only used Perchloroethylene (PCE). It began operating as a Dryclean USA facility in 1986; however, it may have operated before then under a different name.

The Dryclean USA #305 is located in a stand-alone building along a service road adjacent to US Highway 17. Residential neighborhoods abut the commercial and retail strip alongside either side of US Highway 17.

Groundwater is used locally for public supply by the City of Mount Pleasant. All public wells now used by the city are screened deep below a confining unit that prevents downward contamination. A small public supply well drawing water from above the confining unit serves an apartment complex approximately 0.7 mile southwest of the site. Shallow private wells are also located within the vicinity of the site. Most of the private wells are used for irrigation supply, although at least one nearby private well has been identified as the sole source of drinking water for a residence.

The DCRTF investigation began in September 2002. Hundreds of soil, surface water, and groundwater samples have been analyzed from 67 direct-push profiles and 20 permanent monitoring wells installed by the DCRTF. In addition, samples have been analyzed from 43 private wells in the residential neighborhoods on either side of US Highway 17. The extent of the contamination has been determined; however, further activities are suspended due to a lack of funds.

Soils at the drycleaning plant were found to have significant levels of PCE and two breakdown components, Trichloroethylene (TCE) and Dichloroethylene (DCE). The soil contamination is concentrated around a septic-tank that was used before sewer lines were extended to this section of Mount Pleasant.



**Aerial photograph of Mt. Pleasant Dryclean USA.**

**Shaded area is the groundwater contamination plume.**

The groundwater near the plant contains PCE (12,000 ppb), TCE (6900 ppb), and DCE (3100 ppb). The contamination plume appears to split into two major directions of flow. One component of flow carries the contamination approximately 1000 feet to the northwest. The other component flows 1200 feet to the east. Altogether, the contamination covers an area of approximately 40 acres (800 feet wide by 2200 feet long.) The contamination extends down to the confining unit 36 feet below the ground surface, but does not penetrate into it.

Five of the private wells have detectable levels of drycleaning solvents but are only used for irrigation supply. The northwest component of the groundwater plume approaches, but does not yet reach, a private well used for drinking water supply. Neither component of the plume threatens the public well used by the apartment complex southwest of the site.

Even though natural breakdown of PCE is occurring, the levels of groundwater contaminants are unlikely to meet regulatory levels without an engineered remedial intervention. Remediation of the groundwater plume will be suspended due to insufficient funds.

**Kawasaki Cleaners**  
**205 North Goose Creek Blvd.**  
**Goose Creek**  
**Priority #23**

Assessment	<b>\$ 154,138</b>
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**Status:           Assessment Complete.**  
**Remediation Suspended Due to Insufficient Funds.**

Kawasaki Cleaners is currently used as a dry-drop store but was used at one time as a drycleaning plant. Records indicate that the store used Perchloroethylene (PCE) for at least one year (1965-1966). The extent of the contamination has been determined; however, further activities are suspended due to a lack of funds.

The Kawasaki Cleaners is located in a strip mall shopping center. The surrounding property is primarily commercial bordering on residential.

Most of the nearby population uses public water supplied by the City of Goose Creek from surface water intakes located miles away from the drycleaning plant. Groundwater is used locally for public water supply at a few mobile home parks located between ½ and 1 mile from the site. In addition, a day care center within ½ mile uses a private well as its source of drinking water. Other private wells are possible near the site but are not definitely known to exist.

The DCRTF site investigation began in September 2002 and was completed in April 2003. Samples were collected and analyzed from direct-push groundwater profiles and 13 monitoring wells installed by the DCRTF.

A groundwater contamination plume has been delineated that appears to stay under the strip mall property. The plume covers an area approximately 400 feet long by 300 feet wide and extends down to 48 feet deep. The plume contains PCE (4,500 ppb) and the breakdown components Trichloroethylene (400 ppb), Dichloroethylene (340 ppb), and Vinyl Chloride (9 ppb). All of the compounds exceed their respective Drinking Water Standards.

Even though natural breakdown of PCE is occurring, the levels of groundwater contaminants are unlikely to meet regulatory levels without an engineered remedial intervention. Remediation of the groundwater plume has been suspended due to insufficient funds.



**Truck-Mounted Direct Push Rig at  
Kawasaki Cleaners, Goose Creek**

**Superior Cleaners  
2910 Abbeville Highway  
Anderson  
Priority # 24**

Assessment	<b>\$ 131,443</b>
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**Status:           Assessment Complete.  
                      Remediation Suspended Due to Insufficient Funds.**

The Superior Cleaners Site is a full-service drycleaner that has been operating since 1962. The facility used Perchloroethylene (PCE) and has recently switched to Green Earth© drycleaning solvent. The extent of the contamination has been determined; however, further activities are suspended due to a lack of funds.

The drycleaning plant is in a stand-alone building surrounded on two sides by residential properties. Other nearby land uses are predominantly commercial and retail properties.

Most of the surrounding population uses public water supplied by the City of Anderson from surface water intakes located miles away from the drycleaning plant. There is limited use of groundwater near the site; however, one public supply well for a mobile home park is located 1.1 miles west of the drycleaning plant. There may also be private wells within the vicinity of the drycleaning plant, but none are known within the contamination zone.

The site investigation began in November 2001 and was completed in July 2002. DCRTF activities have included analysis from 3 direct-push soil profiles, 13 direct-push groundwater profiles, and 17 permanent monitoring wells. PCE concentrations of up to 600 ppb have been detected in groundwater (compared to the Drinking Water Standard of 5 ppb). The contamination plume is approximately 250 feet long by 175 feet wide and about 70 feet deep. The contamination is found in the bedrock, although there is no evidence that it is moving through the bedrock fractures.

Soil samples collected around the drycleaning plant found trace levels of PCE, but none above the action levels established for ingestion of soil. Liquids and sediments were also collected from the town's sewer system. There does not appear to be any significant spread of drycleaning solvents via this mechanism. There also are no nearby surface water bodies that can be affected by the site.

The site investigation has progressed to the point such that various remedies can be explored to remediate the plume. However, further activities have been suspended due to insufficient funds.

**Hubbard's Cleaners**  
**204 Graham Street**  
**Florence**  
**Priority #25**

Assessment (budgeted)	<b>\$ 30,736</b>
Spent to date	<b>\$ 30,736</b>

**Status:           Assessment Incomplete.**  
**Further Activities Suspended Due to Insufficient Funds.**

Hubbard's Cleaners operated as drycleaner from 1945 to 1993. Two aboveground storage tanks used to store Perchloroethylene (PCE) drycleaning solvent have been removed from inside the building. It is not known whether other solvents may have been used.

The Hubbard's Cleaners site is near the center of the City of Florence in a largely residential area that is transitioning to commercial uses. The drycleaning plant was in a stand-alone building that has since been converted to use as a private club/restaurant.

Groundwater is used locally by the City of Florence for public water supply. The nearest public city well, approximately ½ mile from the site, is screened below 500 feet deep and is likely protected from contamination by a geologic confining unit. The City of Florence has other wells within two miles of the site that are much shallower. Also, there are numerous mobile home parks in the area using shallower wells that are not protected by a confining unit.

The DCRTF investigation began in August 2002 and continued through March 2003. Further assessment has been discontinued due to funding limitations. Soil and groundwater contamination has been documented using direct-push apparatus; however, permanent monitoring wells have not been installed. Although the full depth of the plume has not yet been defined because of limitations of the direct-push apparatus, the contamination extends down to at least 60 feet below the ground surface. Based on the preliminary data, elevated concentrations of PCE (2,000 – 3,000 ppb) have migrated to a number of off-site locations.

The data collected thus far shows the groundwater contamination plume has spread over an area of at least 69 acres (2000 feet long and approximately 1500 feet wide).

Further assessment activities will be conducted when funds become available.

**One Hour Martinizing No. 3**  
**1700 Second Loop Road**  
**Florence**  
**Priority #30**

Assessment (budgeted)	<b>\$ 92,306</b>
Spent to date	<b>\$ 60,185</b>

**Status:           Assessment Incomplete.**  
**Further Activities Suspended Due to Insufficient Funds.**

The One Hour Martinizing No. 3 has operated as a full service drycleaner since 1971. It has only used Perchloroethylene (PCE) as the drycleaning solvent.

The One Hour Martinizing No. 3 is located in stand-alone building. The surrounding properties are mostly commercial bordering on single and multi-family residential housing areas.

The City of Florence Groundwater uses local groundwater for its public water supply. The nearest public well is approximately ½ mile from the site and six other wells are operated by the city within two miles of the site. The City of Florence wells are screened at depths of greater than 500 feet deep and are likely protected from contamination by a confining unit. Five mobile home parks within two miles of the site use shallower wells that are not protected by a confining unit.

The DCRTF investigation began in May 2003 and is on-going. Soil and groundwater samples have been collected using direct-push apparatus. Ten permanent monitoring wells have recently been installed. Further assessment will continue after the wells are properly developed and sampled.

Based on the preliminary data, PCE contaminates the groundwater over an area of approximately 250 feet long by 125 feet wide. The bottom of the contamination has not yet been delineated. The plume dimensions may be revised as better data becomes available and further assessment may be needed after analysis of the recently installed wells is completed.



**Shallow monitoring well  
installation using a small  
auger drill rig**

**Georgetown Cleaners**  
**1230 Church Street**  
**Georgetown**  
**Priority #31**

Assessment (budgeted)	<b>\$ 89,864</b>
Spent to date	<b>\$ 85,209</b>

**Status:           Assessment Incomplete.**  
**Further Activities Suspended Due to Insufficient Funds.**

The Georgetown Cleaners site operated as a full service drycleaner from 1952 until November 2003. It has only used Perchloroethylene (PCE) as the drycleaning solvent.

The Georgetown Cleaners was located in a stand-alone building on a busy thoroughfare in Georgetown. While in a predominantly commercial area, the rear of the plant joins onto residential property and a small playground.

Most of the surrounding population uses public water supplied by the City of Georgetown from surface water intakes located miles away from the drycleaning plant. There is no known use of groundwater near the site with the exception of one public supply well located nearly two miles away that pulls deep groundwater from under a confining unit. Nearby surface water and estuarine wetlands support fishery activities.

The DCRTF investigation began in November 2002 and is on-going. Soil and groundwater samples have been collected using direct-push apparatus; however, permanent monitoring wells have not been installed. Based on the preliminary data, PCE contaminates the groundwater over an area of approximately 200 feet long by 160 feet wide. High concentrations of PCE (9,300 ppb) have been found in preliminary testing. The bottom of the contamination has not yet been delineated. The plume dimensions may be revised as better data becomes available.

Further assessment activities will be conducted when funds become available.

**Dryclean USA - Pineland Station**  
**302-B Pineland Mill**  
**Hilton Head**  
**Priority #36**

Assessment (budgeted)	<b>\$ 87,473</b>
Spent to date	<b>\$ 87,473</b>

**Status:           Ongoing Assessment.**

The Dryclean USA - Pineland Station is a full-service drycleaner that uses Perchloroethylene (PCE). It has been a drycleaning facility since approximately 1986.

The Dryclean USA - Pineland Station is located at the end of a strip shopping center. The surrounding area is a mixture of light commercial, retail and medium-density residential areas.

Groundwater is used locally for public water supply by the City of Hilton Head. The nearest public supply well is approximately 0.4 mile away and is screened at less than 200 feet deep. Since this end of the island has some older homes that existed before the extensive resort island development began, a few private wells might be scattered throughout the area. No private wells are known within the plume area or immediately downgradient of any contamination.

The DCRTF site investigation began in February 2003 and is ongoing. Soil and groundwater contamination has been documented using direct-push apparatus. Seven permanent monitoring wells have been installed and sampled; however, additional monitoring wells are needed in order to delineate the extent of contamination. The existing data shows PCE concentrations in groundwater up to 14,000 ppb. The groundwater plume appears to be confined to the area under the shopping center parking lot; however, this may change after additional wells are installed and analyzed.

**Andrews Cleaners**  
**2 East Main Street**  
**Andrews**  
**Priority #39**

Assessment (budgeted)	<b>\$ 19,942</b>
Spent to date	<b>\$ 19,942</b>

**Status:           Assessment Incomplete.**  
**Further Activities Suspended Due to Insufficient Funds.**

The Andrews Cleaners has operated as a drycleaner from 1984. It has only used Perchloroethylene (PCE) as the drycleaning solvent.

The Andrews Cleaners is located in a stand-alone building near the center of Andrews. Adjacent properties are commercial and retail establishments.

Groundwater is used locally for public water supply by the Town of Andrews. The only public supply well used by the town is approximately 0.5 mile from the drycleaning plant. While this deep well is screened below a confining unit, previous impacts of pesticides in the well show that it is vulnerable to impacts of contamination from the surface. Private wells may be scattered throughout the area and may potentially be used as a source of drinking water. No private wells are known within the plume area or immediately downgradient of any contamination.

The DCRTF investigation began in May 2003 and is on-going. Soil and groundwater samples have been collected using direct-push apparatus; however, permanent monitoring

wells have not been installed. Based on the preliminary data, PCE contaminates the groundwater over an area of approximately 780 feet long by 330 feet wide. High concentrations of PCE (79,000 ppb) have been found in preliminary testing. The bottom of the contamination has not yet been delineated. The plume dimensions may be revised as better data becomes available.

Further assessment activities will be conducted when funds become available.

**Dryclean USA-Pope Avenue  
70 Pope Avenue  
Hilton Head  
Priority #47**

Assessment	<b>\$ 85,210</b>
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**Status:           Assessment Complete.  
                      Further Monitoring required.**

The Dryclean USA-Pope Avenue Site operated as drycleaning plant from 1992 until September 2002. The drycleaner used only Perchloroethylene (PCE) in a dry-to-dry machine.

The drycleaning facility was located at the end of a small strip shopping center anchored by a supermarket. The space occupied by the drycleaning facility is now vacant. The surrounding area is a mixture of light commercial, retail and medium-density residential areas.

Groundwater is used locally for public water supply by the City of Hilton Head. At the time the DCRTF began investigation of the site, the nearest public supply well was located approximately 0.25 mile to the northeast. Since then, the City of Hilton Head has quit using the well for reasons unrelated to the drycleaning site. The City of Hilton Head continues to supply public drinking water from other wells located within two miles of the site.

The DCRTF investigation began in March 2002 and was completed in July 2003. Fund-led activities included collecting 11 direct-push profiles in February 2002. Based on the preliminary results, four groundwater monitoring wells were installed in July 2003. Groundwater sampling found low concentrations of PCE (6 ppb) in the shallow groundwater zone ranging from 5 to 15 feet deep. These concentrations are just barely above the Drinking Water Standard (5 ppb). Periodic groundwater monitoring will continue at the site to verify that there is no significant contamination.

Soil samples collected around the drycleaning plant found trace levels of PCE, but none above the action levels established. Liquids and sediments were also collected from the town's sewer system. The drycleaning solvent does not appear to have spread significantly via this mechanism. There also are no nearby surface water bodies that can be affected by the site.



### Appendix: SC Drycleaning Restoration Trust Fund Site List

This list is arranged by county. For a listing in order of Priority, please refer to the website address: <http://www.scdhec.gov/lwm/html/dryclean.html>. Inclusion of sites on this list does not make a site Eligible for the Fund. Scores have been assigned to sites regardless of its Fund Eligibility Status.

<b>ABBEVILLE COUNTY</b>			<b>Priority</b>
Abbeville Cleaners	403 S Main St	Abbeville	140
Farmers Cleaners	303 Poplar St	Abbeville	138
<b>AIKEN COUNTY</b>			<b>Priority</b>
Belvedere Cleaners	502 Clearwater Rd	Belvedere	10
Colonial Cleaners	706 Old Edgefield Rd	NAugusta	***
Former Carlyn Services	217-A Edgefield Rd	N Augusta	171
Former Quick As A Wink Cleaners	153 Pendleton St	Aiken	266
One Hour Cleanerizing	417 Georgia Ave	NAugusta	20
Osbon Laundry & Cleaners	136 Pendleton St Sw	Aiken	***
Oxford Cleaners	165 Market Plaza	N Augusta	***
Sundance Cleaners	1416 Whiskey Rd	Aiken	49
Sundance Cleaners	403-H Silverbluff Rd	Aiken	137
Warneke Cleaners Inc	113 Newberry St Sw	Aiken	***
<b>ANDERSON COUNTY</b>			<b>Priority</b>
Belton One Hour Cleaners	420 S Main St	Belton	16
Deluxe Cleaners	19 Mill St	Williamston	17
Foothills Drycleaning	11026 Anderson Hwy.	Piedmont	***
Modern Cleaners Inc	113 Whitehall Rd	Anderson	63
Modern Dry Cleaners Inc	3307 Cinema Ave	Anderson	76
Professional Cleaners	1504 E Greenville St	Anderson	197
Riggins Garment Care	1903 N Main St	Anderson	290
Riggins Garment Care Inc	215 E Main St	Williamston	242
Soft Touch Cleaners Inc.	2130 E Greenville St	Anderson	***
Superior Cleaners	2910 Abbeville Hwy	Anderson	24
Superior Dry Cleaners	301 E Benson St	Anderson	220
Former Modern Cleanrs	106 Manning St	Anderson	238
<b>BAMBERG COUNTY</b>			<b>Priority</b>
Colonial Cleaners	197 Magnolia Street	Denmark	1
Former Superior (Singleton Printing Co.)	322 S Main St	Bamberg	14
Former Thompson Cleaners	118 Bell St	Bamberg	5
Superior Cleaners	706 N Main St	Bamberg	83
<b>BARNWELL COUNTY</b>			<b>Priority</b>
Color Craft Cleaners	1420 Marlboro Ave	Barnwell	11
Edwards Professional Cleaners	208 Rosemary St	Williston	7
<b>BEAUFORT COUNTY</b>			<b>Priority</b>
Dryclean – USA	70 Pope Ave	Hilton Head	47
Dryclean – USA	302-B Pineland Mill	Hilton Head	36
Dryclean – USA	16 Palmetto Bay Rd	Hilton Head	52
Dryclean – USA	136a Sea Island Pkwy	Ladys Island	28
Dryclean-USA	7 Robert Smalls Pkwy, Ste 5	Beaufort	91
Fomer Dryclean USA	1349 Ribault Rd	Port Royal	112
Fomer Dryclean USA	Coligny Plaza , 7 Pope Ave	Hilton Head	92
Former Advance Cleaners	55 New Orleans Rd	Hilton Head	18
Former Market Place	11 Palmetto Bay Rd,	Hilton Head	3
Tucker Drycleaners	1905 Boundary St	Beaufort	240
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<b>BERKELEY COUNTY</b>			<b>Priority</b>
Citi Financial (Former One Hour Martinizing)	104 South Hwy 52	Moncks Corner	***
Dryclean – USA	211 St James Ave	Goose Creek	232
Gethers Cleaners	206 N Hwy 52	Moncks Corner	29
Kawasaki Cleaners	B-9 Goosecreek Blvd	Goose Creek	23
Kawaski Cleaners	625 Red Bank Rd	Goose Creek	48
One Hour Martinizing	221 N Hwy 52	Moncks Corner	***
Plantation Cleaners	1316 Red Bank Rd, Suite #1	Goose Creek	97
Tommy's Cleaners	431 A St. James St	Goose Creek	***
Yeamans Hall One Hour Maritnizing	1306 Yeamans Hall Rd	Hannahan	256
<b>CALHOUN COUNTY</b>			<b>Priority</b>
City Drycleaners	210 West Bridge St	St. Matthews	***
<b>CHARLESTON COUNTY</b>			<b>Priority</b>
Centerville Cleaners	852 Folly Rd	James Island	75
Charleston Dry Cleaners And Laundry	525 East Bay St	Charleston	88
Chris's Drycleaner (Former)	761 Coleman Blvd	Mt Pleasant	***
Diamond Cleaners	1947 Maybank Hwy	Charleston	218
Dry Clean World	1954 Ashley River Rd, Ste. A	Charleston	***
Dryclean – USA	1643 B Savannah Hwy	Charleston	225
Dryclean – USA	96 Wentworth St	Charleston	109
Dryclean USA	230 Mathis Ferry Rd	Mt Pleasant	103
Dryclean USA	1518 Hwy 17 North	Mt Pleasant	125
Dryclean USA	425 Hwy 17 Bypass	Mt Pleasant	22
East Bay Cleaners	480 East Bay St	Charleston	265
Former Barrineaus Drycleaning (Vacant Lot)	730 Rutledge Ave	Charleston	***
Fomer Dryclean USA (East Bay Hardware)	316 East Bay St	Charleston	241
Fomer Dryclean USA	5634 Rivers Ave	N Charleston	247
Former D&B One Hour	14 Carriage Ln	Charleston	176
Former Dryclean USA -Dental Health Services	520 Folly Rd	Charleston	213
Former Dryclean USA	811 Coleman Blvd	Mt Pleasant	56
Former Dryclean USA	509 A , Hwy 176	Goose Creek	***
Former Dryclean USA (Normandy Farm Spot	410 Coleman Blvd	Mt Pleasant	26
Former Dryclean USA (Mediterranean Catering)	65 Windemere Blvd	Charleston	201
Former Dryclean USA (Social Security Office)	3328 Rivers Ave	Charleston	279
James Island Cleaners	1739 Maybank Hwy	Charleston	188
Kims Cleaners	3655 Rivers Avenue	N Charleston	***
King's Valet Dry Cleaners	1970 Ashley River Rd	Charleston	215
Lenz Dry Cleaning	4727 Mixon Ave	N Charleston	228
Lenz Dry Cleaning	5647 Rivers Ave	N Charleston	244
Lenz Drycleaning And Laundry	2665 Ashley Phosphate Rd	N Charleston	301
Old Towne Cleaners	2140 Savannah Hwy	Charleston	***
Old Towne Cleaners	5405 Dorchester Rd	N Charleston	***
One Hour Valet	8510a Rivers Ave	N Charleston	231
One Hour Valet (Former)	1235 Savannah Hwy	Charleston	211
Pelican Cleaners	1521 Palm Blvd	Isle Of Palms	122
Pressing Club Cleaners	1664 Hwy 171	Charleston	128
Smith Family Cleaners	1015 Harborview Rd	Charleston	141
Smith Family Cleaners	336 Folly Rd	Charleston	174
Swinton Dry Cleaners & Laundry	106 Spring St	Charleston	***
<b>CHEROKEE COUNTY</b>			<b>Priority</b>
Blanton's Cleaners	403 Elm St	Gaffney	95

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<b>CHESTERFIELD COUNTY</b>			<b>Priority</b>
Chesterfield Cleaners	165 W Main St	Chesterfield	***
Pageland Cleaners	122 N Maple St	Pageland	***
Professional Cleaners	1131 W Greene St	Cheraw	21
<b>COLLETON COUNTY</b>			<b>Priority</b>
Anderson's One Hour Cleaners	197 Ivanhoe Dr	Walterboro	2
Sentry Cleaners Of Walterboro	215 Robertson Blvd	Walterboro	38
<b>DARLINGTON COUNTY</b>			<b>Priority</b>
60 Minute Cleaners	635 W Carolina Ave	Hartsville	19
White Swan Cleaners (Fmr. 1 Hr Martinizi	409 Pearl St	Darlington	8
<b>DORCHESTER COUNTY</b>			<b>Priority</b>
Davis Dry Cleaners	10050 Dorchester Rd	Summerville	54
Davis Dry Cleaning	523 N Main St	Summerville	129
Davis Dry Cleaning	100 Miles Rd	Summerville	268
Davis Dry Cleaning	604 Bacons Bridge Rd	Summerville	27
Dryclean USA	9998 A Dorchester Rd	Summerville	70
Dukes Dry Cleaners	5678 Memorial Blvd	Saint George	50
Knightsville Dry Cleaners	1580 Central Ave	Summerville	9
Lenz Dry Cleaning & Laundry	5101 Ashley Phosp.Rd, St100	N Charleston	196
Tip Top Cleaners	1625 N Main St, Suite 101	Summerville	73
<b>EDGEFIELD COUNTY</b>			<b>Priority</b>
Beasons Cleaners	70 Calhoun Street	Johnston	***
<b>FAIRFIELD COUNTY</b>			<b>Priority</b>
Becknell's Cleaners	201 N Congress St	Winnsboro	15
Carolina Cleaners	223 S Congress St	Winnsboro	139
<b>FLORENCE COUNTY</b>			<b>Priority</b>
60 Minute Cleaners	310 North Irby St	Florence	108
Custom Cleaners	1619 W Palmetto St	Florence	146
Florence Steam Laundry	374 W Darlington St	Florence	61
Florence Steam Laundry	1933 W Palmetto St	Florence	132
Former Hubbard's Cleaners	204 Graham St	Florence	25
Former White Swan Cleaners (Fleet Funding)	324 W Evans St	Florence	117
K & M Dry Cleaners	510 Second Loop Rd	Florence	32
One Hour Martinizing	832 S Irby St	Florence	35
One Hour Martinizing	1700 Second Loop Rd	Florence	30
One Hour Martinizing	1701 W Palmetto St	Florence	120
One Hour Martinizing	1105 E Palmetto St	Florence	***
Sunshine Dry Cleaners	1210 S Cashua Dr	Florence	***
Superior Cleaners & Laundry Inc	124 Dansing Street	Lake City	***
The Cleanery	2241 W Palmetto St	Florence	34
Westgate Cleaners	2131 Hoffmeyer Rd	Florence	78
White Swan Dry Cleaners	223 Cherokee Rd	Florence	44
<b>GEORGETOWN COUNTY</b>			<b>Priority</b>
Andrews Cleaners	2 East Main St	Andrews	39
C & L Cleaners Inc	1243 N Fraser St	Georgetown	***
Currys Professional Dry Cleaner	310 Kaminski St	Georgetown	4
Former Georgetown Cleaners	1109 N Fraser	Georgetown	204
Georgetown Laundry & Dry Cleaning	1230 Church St	Georgetown	31
Island Cleaners	Hwy 17 S	Pawleys Island	111
Landys Cleaners Inc	119 N Fraser St	Georgetown	80

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<b>GREENVILLE COUNTY</b>			<b>Priority</b>
Allens University Cleaners	5000 Old Bumcombe Rd St 10	Greenville	***
B & C Cleaners	201 Wade Hampton Blvd	Greenville	***
Bell Laundry And Cleaners	1414 E Washington St	Greenville	164
Brashier Cleaners	25 College St	Greenville	191
Brashier Polk Cleaners	201a W Butler Ave	Mauldin	82
Brashier Polk Cleaners	21 Orchard Park Dr	Greenville	37
Brashier Polk Cleaners	1170a Woodruff Rd	Greenville	64
Carpenter Cleaners	115 E College St	Simpsonville	133
Chois Cleaners	3502 Earle E. Morris Jr. Hwy.	Greenville	***
Church Street Kleaners	860 S Church St	Greenville	162
Crescent Cleaners	717 E Stone Ave	Greenville	181
Crossroads Cleaners	1255 Rutherford Rd	Greenville	81
Debonair Cleaners	496b S Pleasantburg Dr	Greenville	149
Domino's Pizza (Former Quick As A Wink)	2616 Old Anderson Rd	Greenville	69
Dryclean USA	14 Roper Mountain Rd	Greenville	94
Dryclean USA	510 Haywood Rd	Greenville	100
Dryclean USA	3702 Pelham Rd	Greenville	51
Dryclean USA	2500 Wade Hampton Blvd	Greenville	182
Fabricare	405 The Parkway, Suite 600	Greer	***
Fabricare Drycleaning	2801 Wade Hampton Blvd	Taylors	***
Former Dryclean USA	3245 Wade Hampton Bvd	Taylors	57
Former Dryclean USA	114-A W Butler St.	Mauldin	55
Former Dryclean USA	1430 Pelham Rd	Greenville	107
Former Dryclean USA	5 Legrand Blvd	Greenville	106
Former Dryclean USA	3601 E North St	Greenville	248
Former Dryclean USA	810 Pendleton St	Greenville	269
Former Dryclean USA	2402 Laurens Rd	Greenville	229
Former Gregory Brothers	812 Laurens Rd	Greenville	96
Former Lafayette Cleaners	300 Mills Ave	Greenville	226
Former Leawood Cleaners	1223 Poinsett Hwy	Greenville	***
Former Leawood Cleaners	2427 Old Buncombe Rd	Greenville	***
Former Leawood Cleaners	1602 Poinsett Hwy	Greenville	***
Former Leawood Cleaners	3110 Wade Hampton Blvd	Greenville	***
Former Mayhew Cleaners	231 Augusta St	Greenville	208
Former Phenix Supply Warehouse	417 Westfield Street	Greenville	***
Former Powdersville Cleaners, Inc.	3504 Earle E Morris Hwy	Greenville	205
Former Prestige Cleaners #416	299 S Pleasantburg Ave	Greenville	71
Former Sunshine Cleaners	1704 B Laurens Rd	Greenville	127
Gaults Cleaners	200 Jones St	Fountain Inn	***
Gregory Brothers Cleaners	2702 E North St	Greenville	198
Gregorys Laundry & Cleaners Inc	2017 Augusta Rd	Greenville	153
Hillcrest Cleaners	689 Se Main St	Simpsonville	207
J&A Laundry Service	633 N Main St	Simpsonville	90
Jays Laundry & Dry Cleaners	3021 Augusta St	Greenville	40
L & K Dry Cleaners	401 N Main St	Mauldin	42
Lafayette Cleaners, Inc.	1707 Augusta Rd	Greenville	66
Lake Forest Cleaners	1316 N Pleasantburg Dr	Greenville	41
Lane's Cleaners	2131 Woodruff Rd	Greenville	***
Leawood Cleaners & Laundry Inc	1521 N Pleasantburg Dr	Greenville	58
Master's Mark Dry Cleaners	2135 Old Spartanburg Rd	Greer	145
Master's Mark Dry Cleaners	1604 Woodruff Rd	Greenville	118

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<b>GREENVILLE COUNTY (cont.)</b>			<b>Priority</b>
Master's Mark Dry Cleaners	1701 Ponisett Hwy	Greenville	186
Mayhew Laboratories, Inc.	7 Bradshaw St	Greenville	192
Overbrook Laundry	1505 E North St	Greenville	85
Pebble Creek Cleaners	1312 Stallings Rd	Greenville	195
Prestige Cleaners	2100 Augusta Rd	Greenville	300
Prestige Cleaners	510 Rutherford St	Greenville	130
Quick As A Wink	101 S Buncombe St	Greer	116
Quick As A Wink	1118 N Pleasantburg Dr	Greenville	45
Quick As A Wink	1906 Augusta Rd	Greenville	126
Quick As A Wink	3402 W Blue Ridge Dr	Greenville	144
Th' Cleaners "America's Finest"	1536 Laurens Rd	Greenville	193
U.S. 1.99 Cleaners	3715 E North St, Suite N	Greenville	74
<b>GREENWOOD COUNTY</b>			<b>Priority</b>
Emerald City Laundry And Dry Cleaners	705 S Main St	Greenwood	110
Former Greenwood Cleaners	Ellison St @ Montague	Greenwood	199
Former Greenwood Cleaners (Wachovia Bank)	105 Main St	Greenwood	169
Greenwood One Hour #1	118 East Court	Greenwood	235
Greenwood One Hour #2	916 Montague St	Greenwood	243
Pro Cleaners Of Greenwood	1826 Bypass 72 Ne	Greenwood	***
<b>HAMPTON COUNTY</b>			<b>Priority</b>
Estill Dry Cleaners	Clark Ave	Estill	***
Phillip's Dry Cleaners	388 E. Rr Avenue South	Estill	65
<b>HORRY COUNTY</b>			<b>Priority</b>
Conway Cleaners Inc	1510 Third Ave	Conway	189
Former Conway Cleaners	209 Beaty St	Conway	221
Former Dryclean USA	801 South Kings Hwy	Myrtle Beach	260
Georgetown Laundry	17 Bypass (Int. Of 707 & 17)	Myrtle Beach	178
Howard's Dry Cleaners	3401-B North Kings Hwy	Myrtle Beach	271
Little Rivers Cleaners	1670d Harbour Sq. Hwy 17	Little River	33
Myrtle Beach Cleaners	2302-A North Kings Hwy	Myrtle Beach	302
Myrtle Beach Cleaners	725 Broadway	Myrtle Beach	264
Ocean Cleaners	3326 Hwy 17 S	N Myrtle Beach	124
Sand Dollar Cleaners	2138 Hwy 17	Garden City	***
Regal Cleaners	5401 Hwy 544	Socastee	179
Royal Cleaners	612 Broadway	Myrtle Beach	114
Salley Cleaners, Inc	1510 N Main St	Conway	180
Sunny Cleaners	9674 N Kings Hwy	Myrtle Beach	233
Sunshine Cleaners	202 Hwy 17 North	N Myrtle Beach	157
Surfside Cleaners Inc	822 Surside Dr	Surfside Beach	155
Swan Cleaners	2286 Glenns Bay Road	Myrtle Beach	***
Techno Cleaners	5027 Dick Pond Road	Myrtle Beach	***
<b>JASPER COUNTY</b>			<b>Priority</b>
Quality Dry Cleaners	203 W. Main St	Ridgeland	***
<b>KERSHAW COUNTY</b>			<b>Priority</b>
Hazelwood Cleaners #1	529 E Dekalb St	Camden	***
Hazelwood Cleaners 3	828 Hwy 601 S	Lugoff	***

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<b>LANCASTER COUNTY</b>			<b>Priority</b>
Davis Dry Cleaners	120 W Gay St	Lancaster	216
Former Dryclean USA	500 W Meeting St	Lancaster	***
Neat N Clean Dry Cleaners Inc	1317 W Hwy 9 Bypass	Lancaster	168
Quick As A Wink Cleaners	330 S Main St	Lancaster	236
<b>LAURENS COUNTY</b>			<b>Priority</b>
Dry Cleaners And Laundry	554 N Harper St	Laurens	156
Former Sunshine Cleaners	102 W Florida St	Clinton	***
Master Dry Cleaners & Laundry	213 E Main St	Laurens	***
Stephens Dry Cleaners	103 Sullivan St	Laurens	187
<b>LEE COUNTY</b>			<b>Priority</b>
Quality Cleaners	507 S Main St	Bishopville	***
<b>LEXINGTON COUNTY</b>			<b>Priority</b>
Becknells Westside Cleaners	607 Meeting St	West Columbia	203
Bryans Cleaners And Laundry	1243 Lake Murray Blvd	Irmo	89
Burnettes Cleaners	2250 Sunset Blvd	West Columbia	165
Carolina Dry Cleaners	441 Sunset Blvd, Capitol Sq.	West Columbia	***
Dutch Cleaners	533 St Andrews Rd	Columbia	217
Eagle Cleaners	6801 St Andrews Rd	Columbia	115
Former Kleen Care	2223 Augusta Rd	West Columbia	***
Former One Hour Martinizing	1621 Airport Blvd	West Columbia	177
Kleen Kare Cleaners	919 Knox Abbott Dr	Cayce	170
Kleen Kare Cleaners	519 North Lake Dr	Lexington	160
Kleen Kare Cleaners	6179 St Andrews Rd	Columbia	173
Lexington Dry Cleaning	5504 Sunset Blvd	Lexington	184
Lexington Dry Cleaning	7333 St Andrews Rd	Irmo	143
Lexington Dry Cleaning	510 Columbia Ave	Lexington	105
Lexington Dry Cleaning	425 W Main St	Lexington	93
One Hour Martinizing	742 St Andrews Rd	Columbia	183
Shealys Cleaners	154 Fulmer St	Batesburg	***
Skips One Hour Drycleaning	1312 Sunset Blvd	West Columbia	151
Tripp's Fine Cleaners	6020 St Andrews Rd	Columbia	119
Us \$1.75 Cleaners (Vacant)	6169 St Andrews Rd	Columbia	202
<b>MARION COUNTY</b>			<b>Priority</b>
Dixie Laundry And Cleaners	164 E Front St	Mullins	53
Finklea's Movies (Former Joye Cleaners)	Gapway St @ Highway 76	Mullins	***
Harper's Welding & Machine (Former Joye Clnrs)	801a S Main St	Mullins	43
Joye One-Hour Cleaners	1017 Goldbold Ave	Marion	12
Main Street Cleaners	208 N Main St	Marion	13
Quality Cleaners	316 S Main St	Mullins	***
<b>NEWBERRY COUNTY</b>			<b>Priority</b>
Country Clean	1220 Wilson Road	Newberry	99
Country Clean Of Newberry	1322 College St	Newberry	46
Prosperity Dry Cleaners	126 Grace St	Prosperity	6
<b>OCONEE COUNTY</b>			<b>Priority</b>
Keowee Kleaners	508 Bypass 123	Seneca	185
Quality Vip Cleaners	Hwy 28, West Plaza Center	West Union	148
Service Cleaners	120 Windsor St	Westminster	210
Tri-City Cleaners	515 E North 1st St	Seneca	152

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<b>ORANGEBURG COUNTY</b>			<b>Priority</b>
Former One Hour Martinizing	1195 St Matthews Rd	Orangeburg	245
Former Rhoads Cleaners	1555 Russel St	Orangeburg	113
Former Rhoads Cleaners	491 Riverside Dr	Orangeburg	253
Kirkland Cleaners	1193 Henley St	Orangeburg	142
Kirkland Cleaners Inc	212 Whittaker Pkwy	Orangeburg	***
L & S Dry Cleaners	2004 Columbia Rd	Orangeburg	222
One Hour Martinizing	1395 St Matthews Rd	Orangeburg	254
Rhoad's Cleaners	1650 Russell St	Orangeburg	298
Rhoad's One Hour Cleaners	360 Riverside Dr	Orangeburg	246
<b>PICKENS COUNTY</b>			<b>Priority</b>
Alexander Cleaners	210 E Main	Easley	131
Clemson Cleaners	139 Anderson Hwy Suite 260	Clemson	190
Fomer Easley Cleaners	139 Anderson Hwy, Suite 250	Clemson	***
Former Dryclean USA	1815 By Pass 123	Easley	134
One Hour Martinizing	6101 Calhoun Hwy, Suite N	Easley	230
Palmetto Cleaners	919a Anderson Dr	Liberty	121
<b>RICHLAND COUNTY</b>			<b>Priority</b>
US \$1.75 Cleaners	7358-A Two Notch Road	Columbia	***
\$2.50 Cleaners	4558-C Forest Dr	Columbia	***
Arnolds Cleaners	1601 Leesburg Rd	Columbia	250
Arnolds Cleaners	2601 Main St	Columbia	273
Arnolds Cleaners	101 Sunbelt Blvd	Columbia	98
Arnolds Cleaners	2601 Rosewood Dr	Columbia	297
Arnolds Cleaners	3104 Broad River Rd	Columbia	158
Bryan's Dry Cleaning	9380 Two Notch Rd	Columbia	68
Burnettes Cleaners	7045 Parklane Rd	Columbia	175
Burnettes Cleaners	10120 Two Notch Rd	Columbia	166
Burnettes Cleaners	623 Beltline Blvd	Columbia	135
Burnettes Cleaners	1718 Broad River Rd	Columbia	206
Burnettes Cleaners	5213 Trenholm Rd	Columbia	104
Burnett's One Hour Cleaners	6320 Garners Ferry Rd	Columbia	172
Carraige Cleaners	5319 Forest Dr	Columbia	239
Classic Cleaners	2900a Leesburg Rd	Columbia	***
Colonial Cleaners	9765 Two Notch Rd	Columbia	102
Deluxe Cleaners	3007 Broad River Rd	Columbia	223
Deluxe Cleaners	205 Q Columbia Ave	Columbia	***
Ed Robinson Cleaners	3023 Millwood Ave	Columbia	259
Ed Robinson Laundry & Drycleaning	2551 Forest Dr	Columbia	258
Former Burnettes Cleaners	7400 Two Notch	Columbia	194
Former Cedar Chest Cleaners	3315 Broad River Rd, Ste 110	Columbia	***
Former Ed Robinson Cleaners	1000 Block Gervais St;	Columbia	274
Former Ed Robinson Cleaners	2231 Main St	Columbia	275
Former Ed Robinson Cleaners	Dutch Square Mall -	Columbia	159
Former Patrones Cleaners	633 Main St	Columbia	***
Former Richards Cleaners (Vacant)	2601 Two Notch Rd	Columbia	***
Former Splash Laundromat	9221-15 Two Notch Rd	Columbia	84
Former Sunshine Cleaners Addam's Univ. Books	601 Main St	Columbia	***
Former Sunshhine Clnrs -Elderly Daycare	1500 Woodrow St	Columbia	***
Kleen Kare Cleaners	4011 N Main St	Columbia	***
Lexington Dry Cleaning	6041 Garners Ferry Rd	Columbia	272

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<b>RICHLAND COUNTY (cont.)</b>			<b>Priority</b>
Lexington Dry Cleaning	7228 Parklane Rd	Columbia	163
Lexington Dry Cleaning	2336 Decker Blvd	Columbia	212
Master Cleaners Inc Drop Store	1907 Blossom St	Columbia	299
Masters Cleaners Inc	1908 Blossom St	Columbia	86
Michael's Enterprises	1749 Decker Blvd	Columbia	101
Pro Images Uniform (Formerly)	3504 River Dr	Columbia	150
Royal Cleaners	1637 Main St	Columbia	***
Schoony's Sixty Minute Cleaners	3010 Rosewood Dr	Columbia	281
Sunshine Cleaners And Laundry	425 Assembly St	Columbia	267
Tripp's Fine Cleaners	830 Harden St	Columbia	209
Tripp's Fine Cleaners	3301 Forest Dr	Columbia	249
Tripp's Fine Cleaners	1339 Broad River Rd	Columbia	200
Zip Kleen	1320 Main St	Columbia	***
<b>SALUDA COUNTY</b>			<b>Priority</b>
Sara's Alterations	102 S Jefferson St	Saluda	67
<b>SPARTANBURG COUNTY</b>			<b>Priority</b>
(Former) Tom & Steve Dry Cleaners	308 S Main St	Woodruff	***
B & B Cleaners	219 S Alabama Ave	Chesnee	295
Bell Laundry And Cleaners	448 Marion Ave	Spartanburg	288
Camolot Cleaners	1600 Reidville Rd	Spartanburg	284
Domino's Pizza (Former Thomas And Sons Clnrs)	478 Union St	Spartanburg	167
Former City Cleaners	229 W Main St	Spartanburg	***
Former Dryclean USA	346 E Main St	Spartanburg	296
Former Dryclean USA	517 W Main St	Spartanburg	286
Former Dryclean USA	1011 Union St	Spartanburg	79
Former Dryclean USA	1000 N Pine St	Spartanburg	278
Former Dryclean USA	Broadwalk Plaza	Spartanburg	***
Former Dryclean USA John Brown Memorials	307 S Church St	Spartanburg	287
Former Fowler Bros. Cleaners	558 S Church St	Spartanburg	***
Former Fowler Brothers Dutch Girl Cleane	8006 Greenville Hwy	Spartanburg	59
Fowler Brother Cleaner & Laundry	3281 Reidville Rd	Spartanburg	***
Fowler Cleaners	625 S Church St	Spartanburg	257
Hayes Dry Cleaners	201 S Alabama Ave	Chesnee	294
Inman Laundry & Cleaners Inc	4 Blackwell St	Inman	77
Master Mark	2105 E Main St	Duncan	***
Master's Mark Dry Cleaners	2799 Reidville Rd	Spartanburg	255
Master's Mark Dry Cleaners	1949 E Main St	Spartanburg	252
Mike's Cleaners	3079 Boiling Springs Rd	Boiling Springs	276
Moore Cleaners	184 N Dean St	Spartanburg	292
New Method Cleaners	520 N Liberty St	Spartanburg	285
Prestige Cleaners	115 E Blackstock Rd	Spartanburg	291
Prestige Cleaners	1065 Fernwood Rd	Spartanburg	219
Quick As A Wink	1621 Asheville Hwy	Spartanburg	224
Quick As A Wink Cleaners	975 Beaumont Ave	Spartanburg	293
Quick As A Wink Cleaners	243 Reidville Rd	Spartanburg	237
Quick As A Wink Cleaners	201 N Granard St	Gaffney	251
Quick As A Wink Cleaners	1325 Union St	Spartanburg	227
Quick As A Wink Cleaners	2415 Reidville Rd	Spartanburg	262
Quick As A Wink#439	138 Fernwood Dr	Spartanburg	282

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<b>SPARTANBURG COUNTY (cont.)</b>			<b>Priority</b>
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Thomas & Sons Tuxedo Rental	276 S Church St	Spartanburg	289
Vacant-- Former Converse Cleaners	1200 E Main St, Suite 5	Spartanburg	234
Yaggie Cleaners	1752 E Main St	Spartanburg	277
<b>SUMTER COUNTY</b>			<b>Priority</b>
Plaza Cleaners	456 Guignard Dr	Sumter	123
Polar Bear Cleaners	1087-B Alice Drive	Sumter	***
Sumter Laundry & Cleaners, Inc	230 N Lafayette	Sumter	62
Tom & Mary's Put & Take Cleaners	1784 Peach Orchard Rd	Sumter	87
Wash Tub Laundry	370 Miller Rd	Sumter	***
<b>UNION COUNTY</b>			<b>Priority</b>
Modern Cleaners	222 N Pinckney St	Union	136
Modern Dry Cleaners	625 S Pinckney St	Union	***
<b>YORK COUNTY</b>			<b>Priority</b>
Campbell's Cleaners	112 Academy St	Fort Mill	72
Crown Cleaner	725-178 Cherry Rd	Rock Hill	263
Former Dryclean USA	529 Cherry Rd	Rock Hill	261
Fort Mill Cleaners, Inc	100 Fort Milll Square	Fort Mill	***
Fort Mill Dry Cleaners	1160 Cherry Rd	Rock Hill	161
Grayson Dry Cleaners	205 S Main St	Clover	***
Newport Cleaners	5168 Old York Rd	Rock Hill	***
Norgetown Cleaners	2036 N Cherry Rd	Rock Hill	280
One Hour Martinizing	1045 Camden Ave	Rock Hill	270
Quick As A Wink Cleaners	2103 Cherry Rd	Rock Hill	214
Quick As A Wink Cleaners	423 Saluda St	Rock Hill	283
S&S Classic Cleaners	2562 West Main St	Rock Hill	***
Sawyer's Cleaners	325 S Cherry Rd	Rock Hill	60
Stanton Cleaning	126 S Main St	Clover	147

**Inclusion of sites on this listing does not make a site Eligible for the Fund. Scores have been assigned to sites regardless of Fund Eligibility Status.**

**Priority of "\*\*\*\*" indicates site has not been ranked or has not met all eligibility requirements.**



**Drill Rig set up at a drycleaning site. Note the large 8" diameter augers laying in the truck bed ready for use.**